

MATHEMATICS PLE 2021 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province /city	District	Sector	School	Level	Pupil	Year
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PUPIL'S FULL NAME

Sur name : _____

Other names : _____

Answer all questions in this paper. (100 marks)

1	Write the following numbers in words 29 802 604	2	Write the place value of digit 6 in the number 4 567 891
3	Round off 86 948 to the nearest thousands	4	Workout without using a number line. a) $(+4) \times (-8)$ b) $(+12) : (+3)$
5	Find the lowest common multiple of 6, 12 and 18	6	Workout $\left(\frac{2}{5} \times \frac{15}{4}\right) : \frac{5}{6}$

7	Calculate the value of $3x^2y - xz$, if $x = -2$, $y = -1$ and $z = 4$	8	Calculate the price of 12 kg of beans if 6 kg cost 2760 frw
9	Decrease 8000 by 14%	10	Convert $9\frac{2}{5}$ into decimals.
11	Workout $23hg + 50kg = \dots g = \dots mg$	12	Simplify $9a^3b^3 : 3a^2b$
13	Find the two missing fractions in the sequence below $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots, \dots \dots$	14	Use quick arithmetic to work out following: 84×25
15	Express 72 as a product of its prime factors	16	Subtract $3\frac{1}{4} - 2\frac{3}{8} =$

17	A school library has 120 shelves with 98 books each. How many books are there in the library?	18	Eric has 5 notes of 2000 <i>frw</i> , 2 notes of 5000 <i>frw</i> and 20 notes of 500 <i>frw</i> . Calculate the total amount he has.
19	Find the circumference of a circular garden radius is 24 cm ($\pi=3.14$)	20	Find the number whose square is 16
21	Find the compliment of 60^0	22	Evaluate $5^2 + 4^4 =$
23	Convert $18000 \text{ sec} = \dots \text{ hours} \dots \text{ min}$	24	Workout $\frac{\sqrt{400} + \sqrt{625}}{\sqrt{100}} =$
25	Solve the equation $(2x - 1) = 5(x - 1)$	26	<p>The height of the right angle triangle is 3 cm and its hypotenuse is 5 cm.</p> <p>a) Calculate the length of the 3rd side of the triangle in cm</p> <p>b) Calculate the area of the triangle.</p>

27	20% of a number is 60. What is the number?	28	In a class there are 60 children. The ratio of boys to girls is 2:3 respectively. a) How many boys are in the class? b) How many girls are in the class?
29	Mary spends 125, 000 <i>frw</i> on buying food. This is 5% of her monthly salary. How much is her salary?	30	A car took 6 hours to cover a distance. It moved at a speed of 90km/hr. calculate the distance it covered.
31	a) Find the interior angle of sum of a pentagon b) How many sides has a hexagon have? c) Find the Centre angle of a regular Hexagon	32	a) An amount of money gained an interest of 144,000 <i>frw</i> . It was invested for 9 years. If the simple interest rate is 6%, calculate the principal amount. b) Convert 8.09 into fraction and show your working

33	<p>a) Kamana bought a bicycle at 60000frw and after a short time sold it at 5000 frw</p> <ol style="list-style-type: none"> Calculate his loss. Calculate the percentage loss <p>b) Calculate the simple interest of 48, 000,000 frw at 6% for three months.</p>	34	<p>Fifi mixed 4 kg of yellow maize flour with an unknown quantity of white maize flour. The cost price of the mixture was 800 frw per kg.</p> <p>Yellow maize flour cost 900 frw per kg and white maize flour costs 700 per kg when not mixed.</p> <p>Find the quantity in kilograms of the white maize flour used.</p> <p>Show your working.</p>
35	<p>The data below shows the marks obtained (out of 100) by pupils in an English test:</p> <p>88 56 56 76 23 10 89 90 43 23 50 12 54 76 23 22 43 54 29 74 66 43 12 64</p> <ol style="list-style-type: none"> Represent this data in a table of two columns (column 1: Marks, column 2 : Number of pupils obtaining those marks). How many pupils did the test How many pupils scored 76% marks How many pupils got less than 50 % marks? What was the highest mark scored? 		

MATHEMATICS PLE 2019 EXTRACT

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Sector

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School

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Pupil

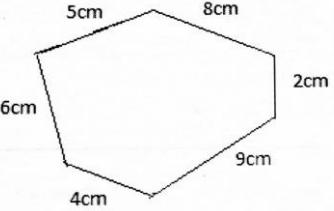
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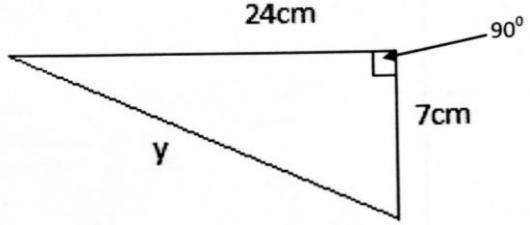
PUPIL'S FULL NAME

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1	Write the biggest number of 8 digits formed by the digits below: 2;3;8;5;4;7;1;9 (2 marks)	2	Arrange the following integers from the lowest to the highest -8; -1 ; +7; +1; +2; -4(2 marks)
3	Write the place value of digit 1 in the following number: 18,526,739(2 marks)	4	Write in words the following number: 277,818,599(2 marks)
5	If $b = 4$, calculate $48 - (15 + b)$ (2 marks)	6	Find 5 % of 45000frw (2 marks)
7	Solve for X in the following equation: $2(X - 1) = X - 3$ (2 marks)	8	Round off 76,948 to the nearest thousands. (2 marks)
9	Express the following fraction as a decimal to 2 decimal places. $2\frac{5}{6} =$ (2 marks)	10	Calculate: $4^3 - \sqrt{100} =$ (2 marks)

11	Workout the calculation below and simplify the answer. (2 marks) $\frac{4.28 + 63.13}{0.02}$	12	12) Find the next two numbers in the digits below: (2 marks) 2;5;11;23; _____ ; _____
13	13) Workout the fraction below and simplify the answer. (2 marks) $(\frac{1}{5} + 3\frac{2}{6}) \div \frac{8}{6} =$	14	14) 10,500 English books are shared among 50 students. Find the number of books shared by each student. (2 marks)
15	Calculate: $(9) \times (-6)$ = (2 marks)	16	Write in words the following number: 21,892,045(2 marks)
17	Evaluate: $6^6 - 4^4$ = (2 marks)	18	Find the GCF or Greatest Common Factor of 120 and 96. (2 marks)
19	Find the size of the exterior angle of a regular polygon if its interior angle is 80° .(3 marks)	20	Find the perimeter of the figure below. (2 marks) 
21	21) A man has 12 notes of 5000frw, 20 notes of 1000frw and 40 notes of 500 frw. Find the total amount of money the man has. (2 marks)	22	22) There are 24 hours in one day, and there are 60 minutes in one hour. How many minutes are there in one day? (2 marks)

23	Calculate: $3\frac{2}{5} + \frac{3}{4} =$ (2 marks)	24 Find the circumference of a circular garden whose radius is 36cm. (Use $\pi = 3.14$) (2 marks)
25	Write the following in descending order: 0.05; 0.12; $\frac{1}{2}$; 0.55; $\frac{2}{5}$ (2 marks)	26 Find the number whose square root is 12. (2 marks)
27	<p>In the figure below:</p>  <p>a) Find the length of the side marked by the letter y. (1 mark)</p> <p>b) Calculate the area of the figure above. (2 marks)</p>	28 If an English exam started at 8:30 am and took $3\frac{1}{2}$ hours, at what time did it end? (3 marks)

29	<p>Joana spends 160,000frw on school fees. This is 10% of her monthly salary. How much is her salary? (3 marks)</p>	30	<p>A water tank has a radius of 4.4m and a height of 8m. Find its volume. ($\pi = 3.14$) (3 marks)</p>																								
31	<p>a) A shopkeeper borrowed 240,000 frw for 6 months at an interest rate of 20% per annum.</p> <p>i) Calculate the interest he should pay after 6 months. (2 marks)</p> <p>ii) Calculate the total amount of money he will pay to the bank. (2 marks)</p> <p>b) Benita bought a radio at 45,000frw and sold it at 32,000frw.</p> <p>i) Find the loss Benita made. (1 mark)</p>	32	<p>A woman went to the market and bought the following items:</p> <p>10kg of rice at 1,000frw/1kg</p> <p>20kg of meat at 3,000frw/1kg</p> <p>5litres of oil at 1,500frw/1litre</p> <p>i) Complete the table below showing the budget she spent. (5 marks)</p> <table border="1"> <thead> <tr> <th>Item no</th> <th>Unit price</th> <th>quantity</th> <th>Total amount</th> </tr> </thead> <tbody> <tr> <td>1. Rice</td> <td>1000</td> <td>10kg</td> <td>$1,000 \times 10 = 10,000$</td> </tr> <tr> <td>2.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4.</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Total = _____ frw</td> </tr> </tbody> </table> <p>ii) On what item did she spend most money? Why? (1 mark)</p>	Item no	Unit price	quantity	Total amount	1. Rice	1000	10kg	$1,000 \times 10 = 10,000$	2.				3.				4.							Total = _____ frw
Item no	Unit price	quantity	Total amount																								
1. Rice	1000	10kg	$1,000 \times 10 = 10,000$																								
2.																											
3.																											
4.																											
			Total = _____ frw																								

	<p>ii) Calculate the percentage of the loss. (2 marks)</p>		<p>iii) What was her balance after spending the money if she had 92,000fr in her pocket before buying? (1 mark)</p>
33	<p>Alan left city A for city B in his car at 10:00am moving at a speed of 30km/hr. At the same time Norah left city B for city A in a new car at a speed of 15km/hr. The distance from city A to B is 480 km</p> <p>i) At what time did the two drivers meet? (3 marks)</p> <p>ii) What distance had Alan covered before meeting Norah? (2 marks)</p> <p>iii) What distance had Norah covered before meeting Alan? (2 marks)</p>	34	<p>If a Kinyarwanda examination at a certain school started at 8:30am and ended at 11 am, how long did the examination take? (3 marks)</p> <p>b) Find the surface area of a cube with a side length of 3cm. (2 marks)</p> <p>c) If the total surface area of a cube equals 96cm^2, what is the length of one side of the cube? (2 marks)</p>

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The table below shows how primary six (P6) Class scored in Kinyarwanda test out of 100 marks.

Marks	50	20	45	30	70	65
Frequency	2	4	6	7	5	9

a) Complete the table below: (2 marks)

Marks(x)	Frequency(f)
30	7
$\sum x =$	$\sum f =$

b) Answer the following questions.

i) How many pupils are in P6? (1 mark)

ii) What is the mode marks? (1 mark)

iii) Find the modal frequency. (1 mark)

iv) Calculate the range marks. (1 mark)

v) Find the mean marks. (1 mark)

MATHEMATICS PLE 2018 EXTRACT

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Province/city

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School

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Pupil

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PUPIL'S FULL NAME

Sur name : _____

Other names : _____

1	Subtract: $867,523 - 374,238$ (2 marks)	2	Test whether 298 is divisible by 9. (2 marks)
3	If $a + b = 20$, and $b = 8$, find the value of a (2 marks)	4	Write in figures: (2 marks) Four hundred forty five million, five hundred eighty four thousand and four hundred nine.
5	Round off 412928.92 to the nearest whole number. (2 marks)	6	What is the place value of 7 in the figure 75 325 961? (2 marks)
7	Workout: $3 \times (15 + 5) - 7$ (2 marks)	8	How many millilitres of water does a bottle of five litres have? (2 marks)
9	Find the value of $-3a - 4b$ if $a = 2$ and $b = -3$ (2 marks)	10	Arrange in ascending order: (2 marks) $\frac{3}{10}, \frac{5}{12}, 0.75, \frac{2}{15}$
11	Solve for x the following equation: $x - 7 = -2x - 1$ (2 marks)	12	Workout: $\frac{0.72 \times 0.24}{0.48}$ (2 marks)

13	Simplify the expression: (2 marks) $2(a - 3) + 4b - 2(a - b - 3) + 5$	4	The interior angle of a regular polygon is 145° . Find the size of the exterior angle of the polygon. (2 marks)
15	Find the area of a regular pentagon whose side is 4cm and apothem is 2cm. (2 marks)	16	Calculate: $3\frac{5}{7} + 2\frac{2}{3} =$ (2 marks)
17	The circumference of a circle is 314cm. Find its diameter in cm. (use $\pi = 3.14$) (2 marks)	18	If two numbers have a difference of 381 and a quotient of 4. Determine these numbers. (2 marks)
19	A man's step is 80cm. How many such steps can he make in a distance of 40dm? (2 marks)	20	Share 170 notebooks among 9 pupils. Give your answer as a mixed fraction. (2 marks)
21	A motorcyclist rides 15km in one hour. How many hours does he take to ride 45km? (2 marks)	22	Find the area of a circle whose diameter is 28m. (2 marks)
23	Given that the total number of pupils in P.6 class is 32 and the difference between the number of boys and that of girls in the class is 10. a. Calculate the number of boys in the class. (1 mark) a. Calculate the number of girls in the class. (1 mark)	24	Calculate 12% of 280,000 (2 marks)

25	Dora has 10,000Frw. She took $\frac{3}{5}$ of that money to buy shoes. Calculate the sum of money she spent on shoes. (2 marks)	26	A man's salary increased in the ratio 2:3 If he was earning 70,000Frw. Calculate his new salary. (3 marks)
27	The cost of a science book and a bag is 75,000Frw altogether. The book costs 15,000Frw more than the bag. Find: a. The cost of the bag. (2 marks) b. The cost of the book. (2 marks)	28	A woman deposited 600,000Frw in the bank for 2 years at an interest rate of 4% per year. a. Calculate the interest she got after the second year. (2 marks) b. Calculate the total amount she got after 2 years.
29	a. Name the regular polygon which has 12 sides. (1 mark) b. What is the interior angle of a regular octagon? (1 mark)	30	The area of a rectangle is 15 square decimetres and its length is 50 centimetres. Find the width of the rectangle. Give your answer in centimetres. (3 marks)
31	Manu, Ally and Eden are friends. They contributed money for paying the insurance of the old people in their cell in 3 to 4 to 5 parts respectively. Manu contributed 40,000Frw. a. How much did Ally contribute? (3 mks) b. How much did Eden contribute? (3 mks) c. Calculate the total contribution of the three members. (1 mk)		

32	<p>In a conference hall, $\frac{2}{6}$ of seats are filled by women, $\frac{1}{5}$ by men and $\frac{1}{3}$ by children.</p> <p>a. What fraction of the conference hall is occupied? (2 marks)</p> <p>b. What fraction of the conference hall is not occupied? (1 mark)</p> <p>c. How many people are in the conference hall if the whole conference room contains 9000 seats? (1 mark)</p> <p>d. Calculate the number of men who are present. (1 mark)</p> <p>e. Calculate the number of women who are present. (1 mark)</p> <p>f. Calculate the number of children who are present. (1 mark)</p>
33	<p>a. What is the volume of a cylinder which is 4cm high and whose circular face has a diameter of 2cm? (2 marks)</p> <p>b. Three friends Lorina, Lariga and Lona contributed to start a business. Lorina paid $\frac{4}{10}$ of the total contribution, Lariga contributed $\frac{3}{10}$ of the total contribution.</p> <p>a. What fraction did Lona contribute? (2 marks)</p> <p>b. If Lona contributed 60,000Frw, what was their total contribution? (3 marks)</p>

34	<p>The table below shows how primary four (P.4) class scored in English test out of 100.</p> <table border="1"> <tr> <td>Marks</td><td>50</td><td>30</td><td>40</td><td>42</td><td>80</td><td>70</td></tr> <tr> <td>Frequency</td><td>2</td><td>5</td><td>8</td><td>10</td><td>6</td><td>4</td></tr> </table> <p>a. Complete the table below with the above information (the first row was completed for you). (3 marks)</p> <table border="1"> <tr> <td>Marks(x)</td><td>Frequency(f)</td></tr> <tr> <td>30</td><td>5</td></tr> <tr> <td></td><td></td></tr> <tr> <td></td><td></td></tr> <tr> <td></td><td></td></tr> <tr> <td></td><td></td></tr> <tr> <td></td><td></td></tr> <tr> <td>$\sum x = \text{_____}$</td><td>$\sum f = \text{_____}$</td></tr> </table> <p>b. How many pupils are in P.4? (1 mark)</p> <p>c. Find the highest marks in the class. (1 mk)</p> <p>d. What is the mark obtained by many students? (1 mark)</p> <p>e. How many pupils obtained the lowest mark? (1 mark)</p>	Marks	50	30	40	42	80	70	Frequency	2	5	8	10	6	4	Marks(x)	Frequency(f)	30	5											$\sum x = \text{_____}$	$\sum f = \text{_____}$
Marks	50	30	40	42	80	70																									
Frequency	2	5	8	10	6	4																									
Marks(x)	Frequency(f)																														
30	5																														
$\sum x = \text{_____}$	$\sum f = \text{_____}$																														
35	<p>A bicyclist covered a journey from centre A to centre B in 3 hours at a speed of 20km/h and he took 1 hour to return through the same distance.</p> <p>a. Calculate the distance from A to B. (2 marks)</p> <p>b. Calculate the total distance of the whole journey. (1 mark)</p> <p>c. Calculate the total time used to cover the whole journey. (2 marks)</p> <p>d. Calculate the average speed used for the whole journey. (Write the answer in m/s) (2 marks)</p>																														

MATHEMATICS PLE 2017 EXTRACT

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Province/city

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District

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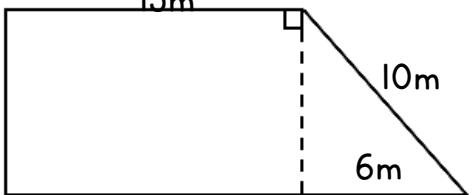
PUPIL'S FULL NAME

Sur name : _____

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1	Calculate: $146,391 + 43,609$ (2 marks)	2	Use a scale of 1:500,000 to find the actual length of the line below: (2 marks)
3	Complete the following sentences with: <i>even, frequency, odd or ratio.</i> (2 marks) a. _____ number can be divided exactly by 2. b. _____ is the number of times that something appears.	4	Calculate the volume of a rectangular tank measuring 6m long, 5m wide and 4m high. (Give the answer in litres) (2 marks)
5	A bus left Huye on Tuesday at 8:00pm and arrived in Rubavu the next day at 2:00am. What time did the journey take? (2 marks)	6	Two complementary angles are t° and 43° . What is the value of angle t° ? (2 marks)
7	Calculate: 246×99 (2 marks)	8	Calculate the average of numbers 61, 52, 48, 21 and 58. (2 marks)
9	Write: <i>seven million, seven hundred thousand and seven</i> in figures. (2 marks)	10	Calculate: $8 \times 10^3 + 5 \times 10^5$ (2 marks)
II	What are the next two numbers in the sequence? (2 marks) -23 ; -17 ; -11 ; _____ ; _____	12	Increase 850Frw by 20% (2 marks)

I3	Calculate: $(250 + 45 \times 4) - 15 \div 3$ (2 marks)	I4	Solve: $3x - (5x - 2) = 0$ (2 marks)
I5	Write the first four prime numbers. (2 marks)	I6	Express 0.25 hectares into ares. (2 marks)
I7	Add and leave the answer in base two (binary): 11_{two} + 11_{two} (2 marks)	I8	Calculate the number of sides of a regular polygon whose exterior angle is 20° . (2 marks)
I9	Fill in the missing figures: (2 marks) 3720 seconds = _____ hours _____ minutes	I20	Set $A = \{3, 7, 9, 11, 15, 17, 27, 37\}$ and Set $B = \{3, 11, 27\}$ (2 marks) a. List the members of $A \cap B$ b. Describe the relationship between set A and set B.
I21	A child sold a hen at 4,299Frw. How much did he/she buy it if he made a loss of 16%? (2 marks)	I22	Write in words: 75.27 (2 marks)
I23	Find the Lowest Common Multiple (LCM) of 624 and 208. (2 marks)	I24	Find the area of a square garden whose perimeter is 164m. (2 marks)
I25	Workout: $6 - 2.174$ (2 marks)	I26	Calculate: $\frac{12}{16} \times \frac{6}{9} + \frac{25}{50}$ (2 marks)

27	<p>Find the area of the figure below. (3 mks)</p> 	28 There are 235 guests at a wedding. What is the least number of circular tables needed to seat all the guests if each table seats exactly 8 people? (3 marks)
29	<p>The distance from the first to the last pole in a line is 5,540 metres. If the interval between two consecutive poles is 20m, (3 marks)</p> <p>a. how many intervals are there?</p> <p>b. how many poles are there?</p>	30 Fifteen pupils were to pay a sum of 4,500Frw. Some of them were unable to pay their shares and each pupil of the rest must pay 75Frw more. How many pupils were unable to pay? (4 marks)
31	<p>A radius of a cone is 6cm and its slanting side (g) is 10cm. Using $\pi = 3.14$, calculate;</p> <p>a. the total surface area. (5 marks)</p> <p>b. the volume of the cone. (2 marks)</p>	
32	<p>Tap A takes 3 minutes to fill a tank and tap B takes 4 minutes to draw water from the tank. How many minutes will it take to fill the tank if both taps are left open? (7 marks)</p>	
33	<p>A businessman sold 9kg of two types of mixed beans at 500Frw per kg but 4kg of one type cost 300Frw per kg. What is the cost of each kg of the second type? (7 marks)</p>	

34	<p>At a speed of 60km/hr a car covered a journey from town A to town B in 3 hours and it took 2 hours to return to town A.</p> <p>a. Calculate the distance from town A to town B. (3 marks)</p> <p>b. Calculate the average speed for the whole journey. (4 marks)</p>
35	<p>A businesswoman got a loan of 180,000Frw from a bank at 10% per annum compound interest.</p> <p>a. How much interest did the businesswoman pay after 2 years? (5 marks)</p> <p>b. What was the total amount that she returned to the bank? (2 marks)</p>

MATHEMATICS PLE 2016 EXTRACT

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Pupil

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PUPIL'S FULL NAME

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1	Round off 594,740 to the nearest thousands. (2 marks)	2	Write the following number in words: 540,032 (2 marks)
3	Compare the numbers below, using the sign $<$, $>$ or $=$ (2 marks) $\frac{5}{11} \text{ _____ } 0.677$	4	Find the missing number to make the statement correct: (2 marks) $39 \times (82 + \text{_____}) = 39 \times 100$
5	Add: $2.4263 + 3.02$ (2 marks)	6	Fill in the next two missing numbers: (2 marks) $2 ; 4 ; 16 ; \text{_____} ; \text{_____}$
7	Express 5% as a fraction in the lowest terms. (2 marks)	8	Evaluate $\frac{a^2 \div b}{c - d}$, if $a = 3$; $b = -3$; $c = 2$ and $d = 5$ (2 marks)
9	Convert: (a). $43,000\text{g} = \text{_____ kg}$ (b). $5.5 \text{ tons} = \text{_____ kg}$	10	Find the circumference of a circle whose radius is 5cm. ($\pi = 3.14$) (2 marks)
11	Express the number $1\frac{1}{5}$ as a percentage. (2 marks)	12	Use a quick multiplication method to calculate the product 84×49 (2 marks)

13	If angle k and 70° are supplementary angles, find the size of angle k. (2 marks)	14	Solve the equation to find the value of x : $3(x + 2) = 21$ (2 marks)
15	Is the number 835,879 divisible by 11? Show how you arrive to the answer. (2 marks)	16	Find the highest common factor (H.C.F) of 112 and 168. (2 marks)
17	Find the average age of four children whose respective ages are 4 years, 6 years, 8 years and 10 years. (2 marks)	18	Bwuzu bought a shirt at 6,000Frw. He sold it at 7,200Frw. What was his percentage profit? (2 marks)
19	Given the number 500.073, what is the place value; (2 marks) (a). of 5? (b). of 7?	20	The cost of 5 bottles of orange juice is 4,000Frw. What is the cost of 3 bottles of the same juice? (2 marks)
21	Arrange the following fractions in descending order: $\frac{3}{8}$; 0.25 ; $\frac{5}{12}$ (2 marks)	22	Find the volume of firewood in a stack of 3m by 2m by 3m in desteres (dst). (2 marks)
23	Add: 7 hours 25 minutes + 1 hour 45 minutes (2 marks)	24	Draw the following angles: (2 marks) (a). Reflex angle (b). Right angle
25	Calculate: $\frac{1}{2} + \frac{1}{4} - \frac{1}{5}$ (2 marks)	26	Find the lowest common multiple (LCM) of 48 and 64. (3 marks)

33	<p>In a class of 16 pupils, 8 pupils like English, 10 pupils like Mathematics and x pupils like both subjects. Each pupil likes at least one of the subjects.</p> <p>(a). Represent this information on a Venn diagram. (3 marks)</p> <p>(b). Find, x, the number of pupils who like both subjects. (4 marks)</p>
34	<p>A man spent $\frac{1}{3}$ of his money on buying food and $\frac{1}{6}$ of the remainder on communication.</p> <p>(a). What fraction of his money was he left with? (5 marks)</p> <p>(b). If he was left with 15,000Frw, how much did he have at the beginning? (2 marks)</p>
35	<p>A trader borrowed 600,000Frw from a bank at an interest of 6% per year.</p> <p>(a). How much interest must he pay after five (5) months? (5 marks)</p> <p>(b). What amount will the trader pay altogether? (2 marks)</p>

MATHEMATICS PLE 2015 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

<input type="text"/>	<input type="text"/>
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District

<input type="text"/>	<input type="text"/>
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Sector

<input type="text"/>	<input type="text"/>
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School

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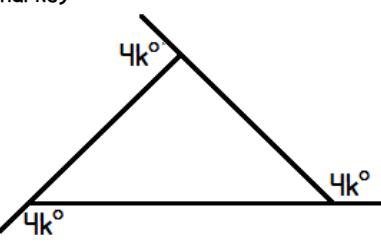
Pupil

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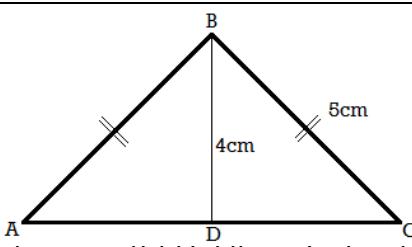
PUPIL'S FULL NAME

Sur name : _____

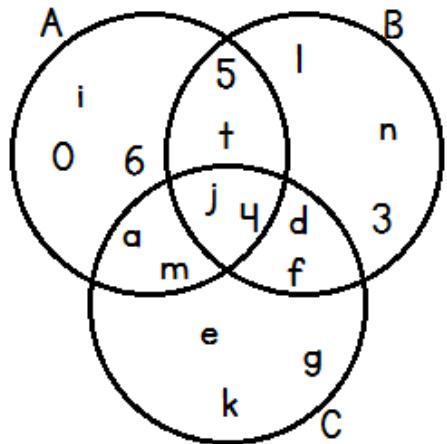
Other names : _____

1	Write the following number in figures: <i>Seven hundred and seventy million, eight hundred and eighteen thousand, five hundred and fifty five.</i> (1 mark)	2	Evaluate: $9^3 + 4^5$ (1 mark)
3	Find the value of: $a^3 + 3b^2$ when $a = 2$ and $b = -2$. (2 marks)	4	Workout: (2 marks) $16 \text{ h } 15 \text{ sec} - 8 \text{ h } 25\text{min } 55 \text{ sec}$
5	What are the place values of 3 and 6 in the number 235.6? (2 marks)	6	Find the next two numbers in this progression: (2 marks) 1, 6, 36, _____, _____
7	The difference between two numbers is 6 and their sum is 20. Find the two numbers. (2 marks)	8	Find the value of k in degrees in the figure below. (2 marks)
			

9	How many decasteres of wood can be obtained in a stack of firewood measuring 10m by 4m by 2m? (2 marks)	10	Alice will be 17 years in 4 years. (a). How old was she 3 years ago? (2 marks) (b). How old will she be 6 years from now? (1 mark)
11	100 pupils have enough food for 36 days. How long would this food last if the number of pupils was 80? (3 marks)	12	(a). Calculate 60% of 200. (1 mark) (b). Write 0.36 as a fraction. Give your answer in the lowest terms. (2 marks)
13	A circle has a diameter of 100cm. (a). Calculate the area of the circle in cm^2 . (use $\pi = 3.14$) (2 marks) (b). Write your answer in part (a) above in m^2 (1 mark)	14	Simplify: $\frac{4}{6} \times \left(\frac{6}{8} \div \frac{2}{6} \right)$ (3 marks)
15	The distance between two towns is 8km. A map on which these towns are shown has a scale of 1:50 000. Calculate the distance between the two towns on the map. Give your answer in centimetres (cm). (3 marks)	16	The ratio of boys to girls in a school is 2:7. If the total number of pupils in this school is 720. How many boys and girls are there? (3 marks)
17	(a). Change 8_{ten} to base five. (2 marks)	18	A car covered a journey from town A to town B at a speed of 30km/hr in 6 hours and it took 4 hours to return through the same distance. (a). Calculate the distance from town A to town B. (1 mark)

	(b). Add: $110_{\text{two}} + 11_{\text{two}} = \text{_____ two}$ (2 marks)		(b). Calculate the average speed of the whole journey. (2 marks)
19	The sum of two numbers is 18 and their quotient is 2. Find the two numbers. (3 marks)	20	Mucuruzi mixed 40kg of beans which cost 300Frw per kg with 60kg of beans of a different type. Find the unit price of the second type if the mixture costs 180 Frw per kg. (2 marks)
21	The mass of solid X is 20g and its volume is 25cm^3 . The mass of solid Y is 30g and its volume is 40cm^3 . Which solid has greater density? (3 marks)	22	A trader banked some money for 3 years at a simple interest rate of 10% per year. If the interest is 90,000Frw, how much did he bank? (3 marks)
23	A man spent $\frac{1}{2}$ of his salary on school fees, $\frac{1}{3}$ of the remaining on food and saved the remainder which is equal to 100,000Frw. Calculate the man's salary. (3 marks)		
24	Study the figure below: a). Find the length AC (2 marks) b). Find the perimeter of triangle ABC (1 mark)		
25	The diagonals of a rhombus are 16cm and 30cm. Calculate the perimeter and area of the rhombus. (3 marks)		

30 From the Venn diagram below, list the elements of the sets following: (7 marks)



(a). Set A

(b). Set C

(c). Set $A \cap B$

(d). Set AUB

(f). Set $A \cap (B \cap C)$

(e). Set $B \cap C$

(g). Set $A \cap (B \cup C)$

MATHEMATICS PLE 2014 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

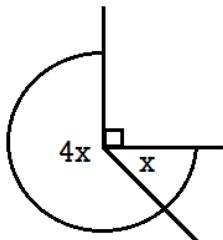
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PUPIL'S FULL NAME

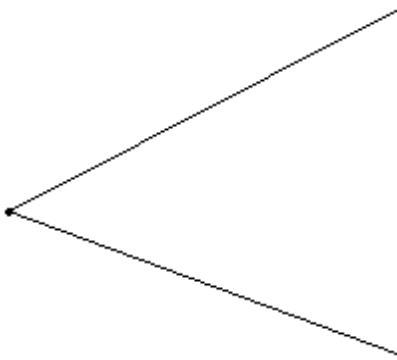
Sur name : _____

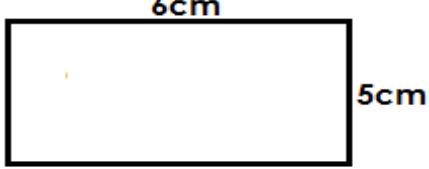
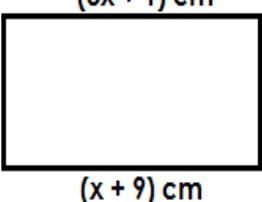
Other names : _____

1	Add: $563,091 + 36,909$ (2 marks)	2	(a). What is the place value of 0 (zero) in the figure 460,123? (1 mark) (b). Write in figures: <i>Six million, eight hundred thousand, twenty six.</i> (1 mark)
3	What is the square root of 2.25? (2 marks)	4	Subtract: $0.2\text{hm}^2 - 4\text{dam}^2 = \text{_____ m}^2$ (2 marks)
5	Add and express the answer in binary: $101_{\text{two}} + 10_{\text{three}}$ (2 marks)	6	Calculate: $2\text{h } 30\text{min} - 1\text{h } 45\text{min}$ (2 marks)
7	In the figure below, find the value of x . (2 marks)	8	Find the mean of: 9, 3, 1, 8, 4 and 5. (2 marks)



9	<p>How many lines of symmetry does;</p> <p>(a). a rectangle have? (1 mark)</p> <p>(b). a square have? (1 mark)</p>	10	<p>In the figure below, which of the angles a, b or c is equal; (2 marks)</p> <p>(a). to an ?</p>
11	Find the area of a square whose perimeter is 18cm. (2 marks)	12	Express 105 as a product of its prime factors. (2 marks)
13	Solve for x: $2x - 1 = 2 - x$ (2 marks)	14	Calculate the Highest Common Factor (HCF) of 9, 12 and 15. (2 marks)
15	<p>In a class of 40 pupils, the ratio of boys to girls is 2:3. Find the;</p> <p>(a). number of girls in the class. (1 mark)</p> <p>(b). number of boys in the class. (1 mark)</p>	16	<p>In a school of 1,200 pupils, 60% weigh 40kg or more. How many pupils weigh less than 40kg? (2 marks)</p>
17	<p>(a). Six books cost 2,400Frw altogether. How many similar books can be bought with 5,000Frw? (2 marks)</p> <p>(b). How much money will remain?</p>	18	<p>A pupil scored 28 marks out of 40. Express the pupil's marks as a percentage. (2 marks)</p>
19	A water tank contains 6,000litres of water. If a tap is opened and releases water at 20 litres per minute, how long will it take the tank to become completely empty? (2 marks)	20	<p>Simplify completely: $\left(\frac{3}{5} \div \frac{4}{5}\right) \times \frac{4}{9}$ (2 marks)</p>

21	<p>Evaluate: $\frac{4mp + 3n}{n}$ when $m = -3$, $n = 6$ and $p = -2$ (2 marks)</p>	22
23	<p>(a). Measure the acute angle below and write its size. (1 mark)</p>  <p>(b). Using a pair of compasses and ruler, bisect the acute angle above. (1 mark)</p>	24
25	<p>The total surface area of a sphere is $5,544\text{cm}^2$. Find its volume. (2 marks)</p>	26

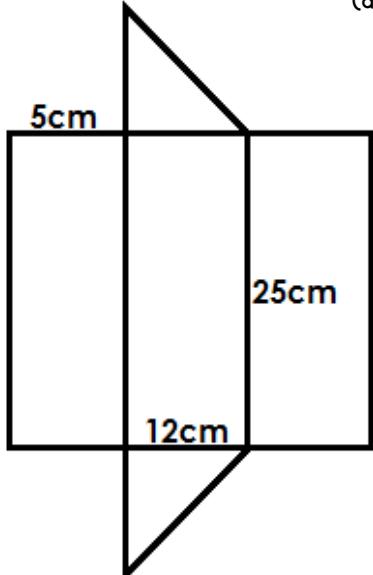
<p>27) Arrange the following fractions in ascending order: $0.42, \frac{11}{25}, \frac{12}{30}, 0.41$ (3 marks)</p>	<p>28) A rectangular flower garden is represented by a scale drawing below with a scale lcm representing 10m.</p>  <p>Calculate: (3 marks)</p> <p>(a). the actual length of the garden.</p> <p>(b). the actual width of the garden.</p> <p>(c). the surface area of the garden.</p>
<p>29) An interest of 20,000Frw was made after 2 years at a simple interest rate of 10% per year. Find the amount of money invested. (3 marks)</p>	<p>30) The figure below is a trapezium. Find its area. (3 marks)</p> 
<p>31) (a). If $a = -1$, $b = 2$ and $c = 3$, find the value of $2a^2b - ac$. (2 marks)</p> <p>(b). Observe the figure below and answer the questions that follow.</p> <p>(a). Name the figure. (1 mark)</p>  <p>(b). Calculate the value of x. (2 marks)</p>	

(c). Calculate the perimeter and the surface area of the figure. (2 marks)

32 A sum of 3,000,000Frw is invested for 2 years at a compound interest of 5% per year. What is the
(a). interest after 2 years? (5 marks) (b). Amount of money after 2 years?
(2 marks)

33 The height of a cylinder is 10cm and its base circumference is 44cm. ($\pi = \frac{22}{7}$). Find the
(a). Volume of the cylinder. (3 marks) (b). Total surface area of the cylinder.
(4 marks)

34 The figure below shows the development (net) of a certain prism.
(a). Calculate the volume of the prism. (2 marks)



(b). Calculate the total surface area of the prism.
(5 marks)

35

Below are marks scored by 20 pupils in a Mathematics test marked out of 20 marks.

10	11	12	15	8	11	16	10	12	10
11	12	8	10	16	10	8	10	8	12

(a). Complete the frequency table below. (4 marks)

Marks (x)	Frequency (f)	(fx)
	Total $f =$	Total $fx =$

(b). Find the mode mark. (1 mark)

(c). Calculate the mean mark. (2 marks)

MATHEMATICS PLE 2013 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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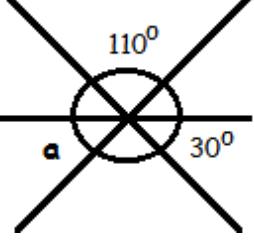
Pupil

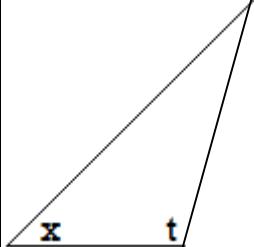
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PUPIL'S FULL NAME

Sur name : _____

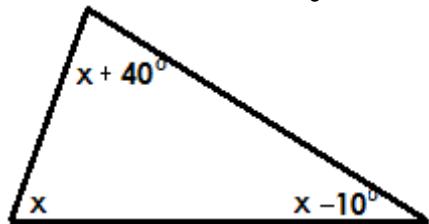
Other names : _____

1	Add: $2,045 + 1,055 + 900$ (2 marks)	2	Write in words: 3,005 (2 marks)
3	Add: $200\text{g} + 0.04\text{kg} = \text{_____ dag}$ (2 marks)	4	Find the size of angle a in the figure below: (2 marks) 
5	Calculate: 0.84×25 (2 marks)	6	Simplify completely: $\frac{3}{7} \div \frac{9}{14}$ (2 marks)
7	Find the value of m in the equation: $3m - 4 = 5$ (2 marks)	8	Write the next two numbers in the following sequence: (2 marks) $1, 4, 9, \text{_____}, \text{_____}$
9	Divide 10, 000Rwf in the ratio 3:7 (2 marks)	10	Decrease 200kg by 20%. (2 marks)

II	<p>The perimeter of the rectangle below is 40cm. Find x. (2 marks)</p> 	I2	<p>The cost of 2kg of beans is 620Rwf. Find the cost of 8kg of the beans. (2 marks)</p>								
I3	<p>A number is increased by 20%. If the new number is 2,400, find the original number. (2 marks)</p>	I4	<p>Find and fill in the missing numbers in the table below. (2 marks)</p> <table border="1"> <tr> <td>4</td><td>7</td><td>6</td><td>_____</td></tr> <tr> <td>9</td><td>_____</td><td>13</td><td>21</td></tr> </table>	4	7	6	_____	9	_____	13	21
4	7	6	_____								
9	_____	13	21								
I5	<p>The solid below is of a cube with a mass of 200g. Find its density. (2 marks)</p>	I6	<p>Find the highest common factor (HCF) of 12, 15 and 21. (2 marks)</p>								
I7	<p>Using a protractor measure angle x and t. (2 marks)</p> <p>(a). Angle x = _____ (b). Angle t = _____</p> 	I8	<p>A man buys a car at 3,000,000Rwf and sells it at 3,900,000Rwf. What is the percentage profit? (2 marks)</p>								
I9	<p>Simplify completely: $1\frac{1}{4} \times 1\frac{1}{15}$ (2 marks)</p>	20	<p>Find the circumference of a circle whose radius is 5cm and $\pi = 3.14$ (2 marks)</p>								
21	<p>If $a = -1$, $b = 2$ and $c = -3$, find the value of: $ab + 2ac$ (2 marks)</p> <p>How many lines of symmetry does a square have? (1 mark)</p> <p>Draw the lines of symmetry in the square below. (1 mark)</p> 	22									

23	Calculate: $2\text{h } 12\text{ min} - 1\text{h } 50\text{min}$ (2 marks)	24	How many 500ml bottles can be filled from 2 litres of water? (2 marks)
25	Electricity poles are fixed 50m apart along a distance of 4,500m. How many poles are fixed? (2 marks)	26	The sum of three consecutive odd numbers is 39. Find the three numbers. (3 marks)
27	Calculate and express the answer in base ten: $\begin{array}{r} \text{III} \\ \text{two} + 102 \text{ three} \end{array}$ (3 marks)	28	Six (6) men complete working in 4 days. How many days will 8 men complete the same work? (3 marks)
29	Arrange the following in ascending order: (3 marks) $\frac{3}{7}; \frac{5}{14}; \frac{13}{28}$	30	Set E = { 2, 3, 4, 6, 7 } and set F = { 1, 3, 5, 7, 8 }. Represent set E and set F on a Venn diagram showing the members of the different subsets. (3 marks)
31	(a). Solve: $\frac{2x}{4} - \frac{x+1}{3} = 2$ (3 marks)		

(b). Find the size of each angle in the figure below: (4 marks)



32 (a). Simple interest of 20,000Rwf was made for two years at 10% profit per year. Find the capital. (3 marks)

(b). 8kg of beans costing 250Rwf per kilogram are mixed with 12kg of another type of beans. If the cost of the mixed beans is 280Rwf per kilogram, find the cost of 1kg of the second type of beans. (4 marks)

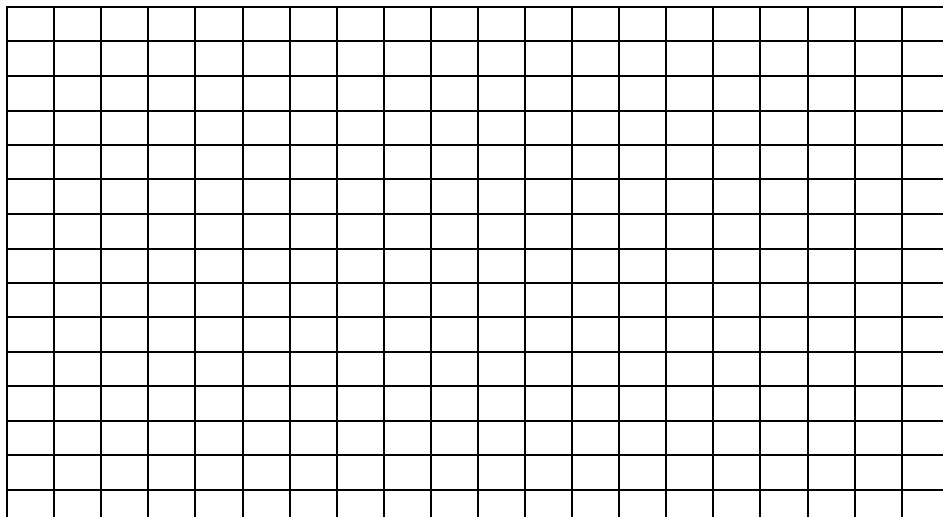
33 Town A and B are 300km apart. A car leaves town A at 8:00am for town B. At the same time a bus leaves town B for town A. The speed of the car is 90km/hr. And the speed of the bus is 60km/hr.

(a). At what distance in km from town A will the car meet the bus? (5 marks)

(b). At what time do the two vehicles meet? (2 marks)

34 The following are the coordinates of points: (0,0), (1,2) and (3,6).

(a). On the graph paper, draw y-axis and x-axis (graduate the axes). (2 marks)



(b). Plot those points on the graph and join them with a line. (4 marks)

(c). If A (x, 3) is a point on the graph, find x. (1 mark)

35 The following are ages of 10 people: 35, 33, 36, 42, 33, 35, 40, 33, 40, 33.
Make a frequency table and calculate the mean age. (7 marks)

MATHEMATICS PLE 2012 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

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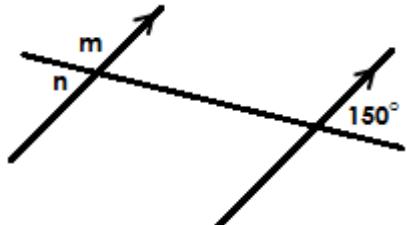
PUPIL'S FULL NAME

Sur name : _____

Other names : _____

1	Find the next two numbers in the following sequence: (2 marks) 4, 7, 10, _____, _____	2	Calculate: $340 \times 4 \div 170 \times 4$ (2 marks)
3	Find the area of a square whose perimeter is 20cm. (2 marks)	4	Simplify: $\frac{1}{3} + \frac{1}{4} + \frac{5}{12}$ (2 marks)
5	Share 7000frw between two students in the ratio of 2:5. (2 marks)	6	Express 140 as a product of its prime factors. (2 marks)
7	Arrange the following in ascending order: (2 marks) $\frac{2}{5}; \frac{1}{3}; \frac{3}{7}$	8	Calculate the area of a parallelogram whose length is 10cm, height is 4cm and width is 6cm. (2 marks)

9	The price of petrol was increased by 2% per litre. Find the new price of 1 litre of petrol if the old price was 990frw. (2 marks)	10	Solve the equation: $2x + 4 = 8 - 2x$ (2 marks)
11	The perimeter of a rectangle is 36cm. Find it's area if its width is 6cm. (2 mks)	12	Add and give the answer in base two: $1011_{\text{two}} + 5_{\text{ten}}$ (2 marks)
13	Set $A = \{2, 3, 5, 7, 11\}$ and set $B = \{10, 5, 2, 4\}$. (a). Find $A \cup B$ (1 mark) (b). Find $A \cap B$ (1 mark)	14	Find the value of x in the figure below. (2 marks)
15	Find the area of a semi-circle whose diameter is 0.14dm. $(\pi = \frac{22}{7})$ (2 marks)	16	Taxi starts from Kigali at 8 : 05am and travels at an average speed of 60km/hr until 9 : 00am. What distance has the taxi travelled? (2 marks)
17	In the figure below, find angles m and n . (2 marks)	18	Write a pair of; (a). Complementary angles. (1 mark) (b). Supplementary angles. (1 mark)



19	There is enough food for 3 people for 12 days. How many days would this food last if there were 9 people? (2 marks)	20	The base of a right angled triangle is 8cm and the hypotenuse is 10cm. Find the height of the triangle. (2 marks)
21	Find angle x in the figure below. (2 marks)	22	Draw an angle of 60° at point A on the line below. Use a ruler, a pair of compasses and a pencil only. (2 marks)
			A * _____
23	A shirt was sold at 20% loss for 8000Frw. What was the cost price? (2 marks)	24	How many lines of symmetry does; (a). A rhombus have? (1 mark) (b). an isosceles triangle have? (1 mark)
25	The cost of a book is 5000frw. How many books can be bought with 24,000frw? (2 marks)	26	Given that $x = -2$ and $y = 3$, find the value of $2x^2 + xy - x$ (3 marks)
27	The perimeter of the base of a cylinder is 31.4cm. Find the volume of the cylinder if the height is 10cm. ($\pi = 3.14$) (3 marks)	28	An interior angle of a regular polygon is 150° . How many sides does the polygon have? (3 marks)

29	<p>A man spent $\frac{1}{8}$ of his salary on fees and $\frac{2}{5}$ of the salary on a car loan. He remains with 380 000frw. What is the man's salary? (3 marks)</p>	30	<p>A Pie chart represents goats, cows and pigs on a farm. The angle representing pigs on the Pie chart is 45°. There are 40 pigs and 120 cows on the farm. How many goats are there on the farm? (3 marks)</p>								
31	<p>Kigali is 50km from Rwamagana. A car leaves Kigali for Rwamagana at 7:30am and travels at an average speed of 45km/hr. At the same time, a taxi leaves Rwamagana for Kigali and travels at an average speed of 30km/hr.</p> <p>(a). Find the distance from Kigali where the two vehicles meet. (5 marks)</p> <p>(b). At what time do the two vehicles meet? (2 marks)</p>										
32	<p>32. Use quick method to calculate: (7 marks)</p> <table border="1"> <tr> <td>642×50</td><td>2224×49</td><td>16999×99</td><td>4444×25</td></tr> <tr> <td></td><td></td><td></td><td></td></tr> </table>			642×50	2224×49	16999×99	4444×25				
642×50	2224×49	16999×99	4444×25								

33 The table below shows the results of football matches played by a school football team.

Number of goals scored	0	1	2	3	4
Number of matches played	3	2	2	3	0

Complete the frequency table below and calculate the mean number of goals per match.

Number of goals (x)	Frequency (f)	(fx)
0		
1		
2		
3		
4		
Total		

Mean goals per match =

34 90 000frw is kept at 10% p.a compound interest. Find the amount kept after 3 years. (7 marks)

35 The information shows two types of beans and their costs per kilogram.

Type	Quantity	Cost per kg
A	300kg	300Frw
B	X kg	400Frw

What is the value of X which would make the cost of one kilogram of the mixture 340 Frw? (7 marks)

MATHEMATICS PLE 2011 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

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PUPIL'S FULL NAME

Sur name : _____

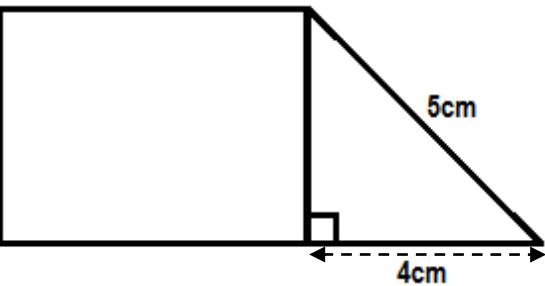
Other names : _____

1	Simplify completely: $\frac{4 \times 12 \times 21}{3 \times 18 \times 14}$ (2 marks)	2	Add and correct your answer to two decimal places: 0.451 + 1.002 (2 marks)
3	Calculate: 2hr 24min — 1hr 56min. (2 marks)	4	Find the next two numbers in the sequence. (2 marks) 2, 6, 18, 54, _____, _____
5	Calculate: $\frac{3}{7}$ of 2l (2 marks)	6	Which of these fractions is the smallest? $\frac{9}{12}$, $\frac{14}{49}$, $\frac{21}{147}$ (2 marks)
7	Find the area of a square whose perimeter is 44cm. (2 marks)	8	Decrease 50 litres of milk by 30%. (2 marks)

9	Simplify: $6x^2y^4 \div 3xy^2$ (2 marks)	10	If $a = 2$, $b = -1$ and $c = 3$, find the value of; $ab + 3c$ (2 marks)
11	Increase 18,000frw in the ratio of 5:3 (2 marks)	12	The side of a regular octagon is 6cm. Calculate the perimeter of the octagon (2 marks)
13	Write in words: 2,450,005frw. (2 marks)	14	4kg of rice are enough for 3 men. How many kg of rice are enough for 12 men? (2 marks)
15	Find the simple interest on 3,000,000frw if the interest rate is 10% per year for 2 years. (2 marks)	16	Use a ruler, a compass and a pencil to bisect the angle below. (2 marks)
17	The height of a triangle is 7cm and the base is 4cm. Find the area of the triangle (2 marks)	18	A piece of wood is in the shape of a semi-circle of diameter 70cm. Calculate the perimeter of the wood. ($\pi = \frac{22}{7}$) (2 marks)
19	A boy is 3 years older than his sister. The sum of their ages is 25 years. How old is the sister? (2 marks)	20	An exercise book costs 200frw. How many exercise books can be bought with 2,100frw? (2 marks)

21	Calculate the volume of a cube with side 6.3cm. (2 marks)	22	A father is visiting his child studying in United States. How many dollars can he buy with 11,000,000frw if 550frw buy one dollar? (2 marks)
23	A bundle of 2000 Rwanda francs notes are arranged in their serial numbers starting with AR0212461 to AR0212480. How many 2000 notes are there? (2 marks)	24	Find the area of a rhombus whose diagonals are 12cm and 18cm.(2 marks)
25	Simplify completely: $\frac{\sqrt{27} \times \sqrt{75}}{5}$ (2 marks)	26	Musa buys a cow for 110,000frw. He sells it at a profit of 10% after paying a tax of 5% on the selling price. What is the selling price? (3 marks)
27	300,000frw is invested at 5% per year compound interest. Find the amount of investment after 2 years. (3 marks)	28	Find the total surface area of a rectangular block whose width is 12cm, length is 19cm and height is 7cm. (3 marks)
29	10kg of beans are mixed with 20kg of maize. One kg of the mixture costs 160frw. If the cost of one kg of maize is 140frw, find the cost of one kg of beans. (3 marks)	30	6 men can cultivate a field in 2 days. How many days will 4 men take to cultivate the same field? (Assume all men are working at the same rate) (3 marks)

31	<p>(a). Solve the equation: $\frac{4x - 2}{5} = \frac{x}{2} + 2$ (4 marks)</p> <p>(b). Remove the brackets and simplify completely: $3(m - 2n) - 2(m - 4n)$ (3 marks)</p>																											
32	<p>Simplify completely: $\frac{\left(\frac{4}{15} \div \frac{8}{45}\right) + \left(\frac{5}{7} \times \frac{14}{15}\right)}{\frac{26}{9}}$ (7 marks)</p>																											
33	<p>Below are marks scored in a test:</p> <p>10 5 13 7 13 5 12 10 10 7 9 13 12 13 10 11 9 11</p> <p>(a). Complete the frequency table below using the above marks. (3.5 marks)</p> <table border="1"> <thead> <tr> <th>No. of pupils x</th> <th>Frequency f</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>5</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> </tr> <tr> <td>11</td> <td></td> <td></td> </tr> <tr> <td>12</td> <td></td> <td></td> </tr> <tr> <td>13</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Sum f =</td> <td>Sum fx =</td> </tr> </tbody> </table> <p>(b). Find the sum of fx. (2 marks)</p> <p>(c). Calculate the mean mark. (1.5 marks)</p>	No. of pupils x	Frequency f	fx	5			7			9			10			11			12			13				Sum f =	Sum fx =
No. of pupils x	Frequency f	fx																										
5																												
7																												
9																												
10																												
11																												
12																												
13																												
	Sum f =	Sum fx =																										
34	<p>(a). Calculate and leave the answer in binary (base two): $1011_{\text{two}} + 110_{\text{two}}$ (2 marks)</p> <p>(b). Convert 72_{ten} to base three (5 marks)</p>																											

35	<p>Set A = { a, b, c, d, e, f } and Set B = { the letters in the word surfaces }</p> <p>(a). List the members of set B (2 marks)</p> <p>(b). List the members of $A \cap B$ (2 marks)</p> <p>(c). List the members of $A \cup B$ (3 marks)</p>
36	<p>Find the area of the right angled trapezium below if it's perimeter is 24cm.</p> 
37	<p>A and B are two towns 170km apart. A bus leaves town A for town B at 9:00 am travelling at 56km/hr.</p> <p>A car leaves town B for town A at 9:00 am travelling at 80km/hr.</p> <p>(a). At what distance from town A do the two vehicles meet? (5 marks)</p> <p>(b). Find the time the two vehicles meet. (2 marks)</p>

MATHEMATICS PLE 2010 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

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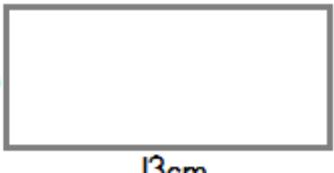
PUPIL'S FULL NAME

Sur name : _____

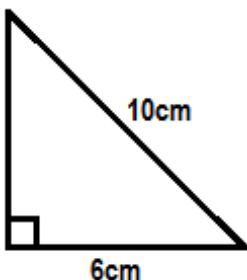
Other names : _____

1	Calculate: $55 \times 12 - 12 \times 55$ (2 marks)	2	What is the place value of 4 in 8542? (2 marks)
3	Arrange the following numbers from the smallest to the largest: 0, 1, 8, 11, 17 (2 marks)	4	Calculate 0.031×11 giving the answer corrected to 2 decimal places (2 marks)
5	Complete: 0.4 litres = _____ cm ³ (2 marks)	6	Write the next two missing numbers in the sequence: (2 marks) 2, 8, 14, _____, _____
7	A car uses 4 litres of petrol to travel 60km. How many km will it travel if it uses 16 litres? (2 marks)	8	Find the Lowest Common Multiple of 15, 24 and 40. (2 marks)

9	Express 48 in terms of its prime numbers. (2 marks)	10	Solve the equation: $4(x + 1) = 2x + 7$ (2 marks)
11	Increase 240kg by 9%. (2 marks)	12	Find the perimeter of a square whose area is 625 cm ² . (2 marks)
13	Complete the table below: (2 marks)	14	In a sale, goods are sold for $\frac{3}{4}$ of the usual price. What is the sale price for a pair of shorts whose usual price is 2000 Frw. (2 marks)
15	$4x^4y^3 \times 2x^2y^2$ (2 marks)	16	To make one cake you use 1.25kg of flour. How many kg of flour will be used to make 6 cakes? (2 marks)
17	Find the circumference of a circle with the diameter of 30cm and $\pi = 3.14$. (2 marks)	18	Decrease 150m in the ratio 3:25. (2 marks)
19	Ten men can dig a garden in 4 days. How many days would it take eight men to dig the same garden? (2 marks)	20	The angles of a triangle are 80° , 30° and x° . Find the value of x° . (2 marks)

21	I,200,000frw is banked at 8% per year simple interest. Find the interest after 3 years. (2 marks)	22	Write 45 in Roman numerals. (2 marks)
23	Calculate the area of the rectangle below: (2 marks)	24	Workout: $45\text{kg} + 65\text{g} + 1000\text{mg} = \text{_____ g}$ (2 marks)
			
25	The base area of a cube is 64cm^2 . Calculate the volume of that cube. (2 marks)	26	If the cost price of a goat is 5000frw and the selling price of the same goat is 6000frw. What is the percentage profit? (3 marks)
27	If the average of 12, x and 8 is 9. What is the value of x ? (3 marks)	28	If a car travels 45km in 50 minutes. How many km does it travel in 2 hours? (3 marks)
29	Simplify: $(\sqrt{64} - \sqrt{25}) \div \sqrt{9}$ (3 marks)	30	The following are the ages of 10 pupils: 11, 12, 12, 13, 11, 14, 15, 11, 12, 11 (a). Find the mode age (1 mark) (b). Find the average age (2 marks)
31	A trader banks 1,000,000frw at a compound interest of 6% per year. Find the amount of money after 3 years. (7 marks)		

32 The figure below is of a right angled triangle. Find it's area. (7 marks)



33 The base of a triangular prism is a right angled triangle. The base of the triangle is 4cm and height is 3cm.

(a). Find the height of the prism if it's volume is 48cm³. (3 marks)

(b). Calculate the total surface area of the prism. (4 marks)

34 (a). If 20kg of beans mixed with maize contains 8kg of beans. How many kg of maize will be found in 35kg of maize mixed with beans? (4 marks)

(b). 50 children have enough food for 18 days. How long would this food last if the number of pupils was 30? (3 marks)

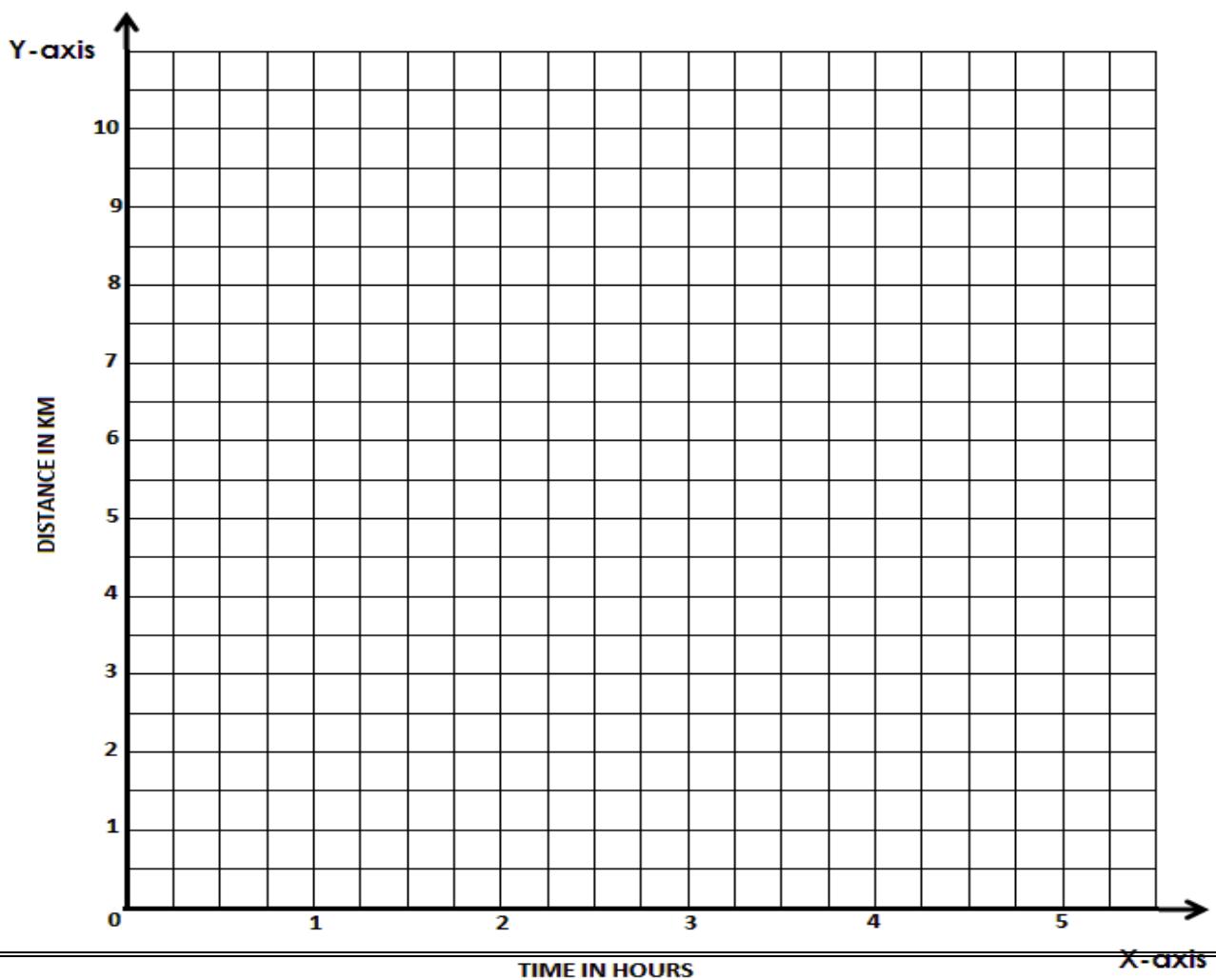
35 (a). Solve: $\frac{2(2x - 1)}{3} = \frac{3(x + 3)}{2}$ (4 marks)

(b). If $m = -2$, $n = 3$ and $p = 5$, find the value of: $2m^2 - 3n + 2p$ (3 marks)

36 (a). Using a ruler and a pair of compasses only, draw a triangle ABC in which line AB = 6.2cm, line BC = 5.0cm and angle ABC = 60°. (5 marks)

37 Use the table below and plot a graph of y against x . (7 marks)

x	1	2	3	4	5
y	2	4	6	8	10



MATHEMATICS PLE 2009 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

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PUPIL'S FULL NAME

Sur name : _____

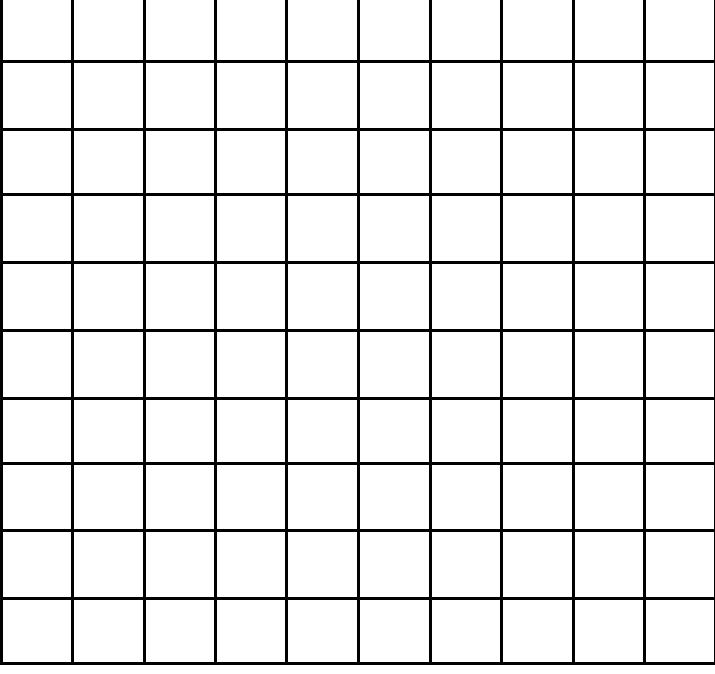
Other names : _____

1	Calculate $246 + 309 + 254 - 209$ (2 marks)	2	Find one fifth of 300g of sugar (2 marks)
3	Divide 0.04 by 5 (2 marks)	4	Workout: (2 marks) 3hrs 10mins — 1hr 40mins = ____mins
5	Which of these statements are true; (2 marks) $-2 < -5$; $0 > -1$; $-6 > -4$; $-5 < -1$	6	What is the complement of 27° ? (1 mark) (b). What is the supplement of 135° ? (1 mark)
7	In a school hall there are 43 rows each containing 14 chairs. How many people can fit in the hall? (2 marks)	8	Workout : $159 - (-467)$ (2 marks)

9	Express $\frac{5}{6}$ of 24 as a fraction of 40. (2 marks)	10	What is the sum of the first six prime numbers? (2 marks)
11	Workout $3.2\text{km} + 67\text{dm} + 234\text{cm} = \text{_____m}$ (2 marks)	12	Increase 800 in the ratio 11:5 (2 marks)
13	Express $\frac{7}{16}$ as a percentage (2 marks)	14	Simplify $x^3y^5 \div x^1y^3$ (2 marks)
15	Sketch a square and draw all the lines of symmetry it has. (2 marks)	16	On a map, a distance of 5cm represents 1.5km. Find the scale of the map. (2 marks)
17	Find the circumference of a circle whose radius is 42cm. ($\pi = \frac{22}{7}$) (2 marks)	18	Solve the following equation (2 marks) $3x + 7 = 5x + 13$
19	The simple interest on a loan of 170000Frw after 9 months is 30600Frw. Find the interest rate per annum. (2 marks)	20	Calculate the area of a triangle with height 6cm and base 8cm (2 marks)

21	The radius of the base of a cylinder is 7cm and it's height is 10cm. Find the volume of the cylinder. ($\pi = \frac{22}{7}$) (2 mks)	22	Calculate $\frac{2}{7} \div \left(\frac{2}{3} + \frac{4}{7} \right)$ (2 marks)
23	The lights flash at intervals of 4s, 6s and 10s respectively. If they are started together, how soon after will they next flash again together? (2 mks)	24	A square has the same area as a rectangle with sides of 9cm by 16cm. What is the length of the side of the square? (2 marks)
25	The ages of 4 children are 12 years, 13 years, 15 years and x years. Find x if the average age of the 4 children is 12.5 years. (2 marks)	26	The selling price of 8kg of sugar is 4320Frw. Find the cost price if the loss is 10%. (3 marks)
27	The angles of a quadrilateral are x° , $(x + 10)^\circ$, $2x^\circ$ and $3x^\circ$. Find the size of each angle. (3 marks)	28	90000Frw is invested at 12% p.a compound interest. Find the amount after 2 years. (3 marks)
29	100kg of beans costing 200Frw per kilogram is mixed with 80kg of beans costing 245Frw per kilogram. Find the cost of one kilogram of the mixture. (3 marks)	30	Three children share 60 sweets in the ratio of 11:10:9. How many sweets did each child get? (3 marks)

31	<p>In a school, there are 180 school boys, 160 school girls and 20 teachers. Represent this information on a pie chart. (7 marks)</p>
32	<p>(a). If the mass of a metal is 12g when the volume is 8cm^3, find the mass of the metal when the volume is 9cm^3. (4 marks)</p> <p>(b). If p varies inversely as q, and $p = 4$ when $q = 6$, find p when $q = 8$. (3 marks)</p>
33	<p>(a). Solve: $\frac{2x - 4}{3} = \frac{x + 9}{7}$ (4 marks)</p> <p>(b). Find the value of: $m^3 - mn^2 + ny^2$, if $m = -2$, $n = 3$ and $y = -5$. (3 marks)</p>
34	<p>(a). Using a ruler, a pair of compasses and a protractor, construct, accurately, a triangle ABC given lines $AB=6\text{cm}$, $BC=7\text{cm}$ and angle $ABC=65^\circ$. (4 marks)</p> <p>b). Measure and state (3 marks)</p> <p>(i). The length of line AC (ii). The angle BAC (iii). The angle ACB</p>

35	<p>Simplify completely: $\frac{\left(3\frac{1}{2} \times 1\frac{1}{4}\right) \div \left(2\frac{1}{2} - 1\frac{3}{4}\right)}{2 \cdot 3 \div 4 \cdot 6}$ (7 marks)</p>
36	<p>Karimba's age is 3 times Rukundo's age. If the total age of Karimba and Rukundo is 20 years, find how many times Karimba will be as old as Rukundo in 5 years' time. (7 marks)</p>
37	<p>(a). Plot the following points on a graph paper and join them with a line: $A(0, 2)$, $B(1, 3)$, $C(2, 4)$, $D(3, 4)$ and $E(3, 0)$. (3 marks)</p> <p>(b). Shade the area under the graph and calculate it. (4 marks)</p> 

MATHEMATICS PLE 2008 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

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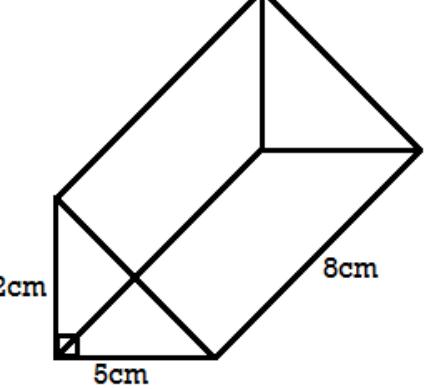
PUPIL'S FULL NAME

Sur name : _____

Other names : _____

1	Calculate $600 \times 0.75 + 0.25 \times 600$ (2 marks)	2	Write in figures: Eleven million eleven thousand and eleven (2 marks)								
3	Calculate and express your answer in ordinary fraction: $1\frac{1}{5} + 0.3$ (2 marks)	4	Simplify: $2x + 5y - 3x + y - 4x + 5x$ (2 marks)								
5	Add and express the answer in hours: 61min 10s + 58min 50s (2 marks)	6	How many twelfths are equivalent to one-third? (2 marks)								
7	Solve: $5x - 10 = 2x - 7$ (2 marks)	8	Find the square root of 1296 (2 marks)								
9	Write the next two numbers in the following sequence: 2, 5, 10, 17, _____, _____ (2 marks)	10	Complete the table below: (2 marks) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>12</td> <td>16</td> <td>20</td> <td>24</td> </tr> <tr> <td>9</td> <td>-----</td> <td>15</td> <td>-----</td> </tr> </table>	12	16	20	24	9	-----	15	-----
12	16	20	24								
9	-----	15	-----								
11	A ship leaves port A at twelve noon on Monday and sails to port B. After a hundred hours, the ship arrives at port B. (2 marks)	12	Use < or > to complete the following statement: $\frac{7}{20} \quad \frac{11}{30}$ (2 marks)								

	<p>(a). At what time does the ship arrive at port B?</p> <p>(b). On which day of the week does the ship arrive at port B?</p>		
13	5kg of sugar were reduced by 1.5kg. In what ratio was the sugar reduced? (2 marks)	14	Find the simple interest on 300 000frw for 4 months at 8% interest rate per year. (2 marks)
15	Find the curved surface area of a cylindrical tube with radius 3.5cm and height 15cm. $(\pi = \frac{22}{7})$ (2 marks)	16	<p>The following are marks scored by 9 pupils: 25, 30, 29, 25, 28, 25, 27, 28 and 30.</p> <p>Find (a). The mode mark (1 mark)</p> <p>(b). The median mark (1 mark)</p>
17	A cow was sold at a profit of 5% for 525,000frw. What was the cost price? (2 marks)	18	500g of bread contains 5g of salt. How much salt is contained in 150g of the bread? (2 marks)
19	The perimeter of a square is 100cm. Find the area of the square. (2 marks)	20	The interior angle of a regular polygon is 150°. How many sides does the polygon have? (2 marks)
21	Add and express the answer in square metres: 2.5ha + 11,000dm ² (2 marks)	22	The diameter of a base of a cone is 6cm and the height is 14cm. Calculate the volume of the cone. $(\pi = \frac{22}{7})$ (2 marks)

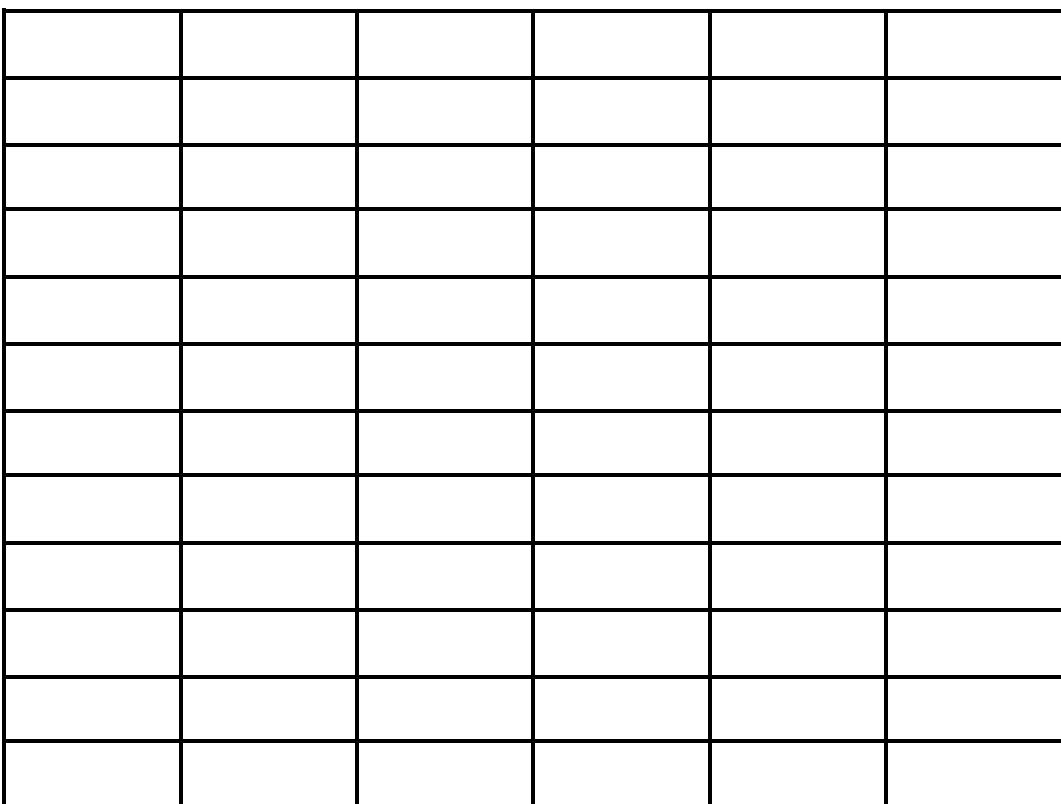
23	<p>The mass of a solid is 178g and its density is 8.9g/cm^3. Calculate the volume of the solid. (2 marks)</p>	24	<p>Trees are planted in a straight line on a stretch of land 2.16km. The distance between a tree and the next tree is 1.8m. Find the number of trees planted. (2 marks)</p>
25	<p>Find the value of: $4m + 2x - y$ if $m = -2$, $x = 0$ and $y = -3$. (2 marks)</p>	26	<p>At 40km/hr, a cyclist can complete a journey in 10 minutes more than at 60km/hr. How long is the journey? (3 marks)</p>
27	<p>Share 350,000frw between John, Mary and Joy so that Joy receives $\frac{1}{2}$ of what Mary receives and Mary receives 2 times as much as John receives. (3 marks)</p>	28	<p>Find the amount of money if 1,000,000frw is invested at 12% per year compound interest for 2 years. (3 marks)</p>
29	<p>Arrange the following fractions in ascending order: $\frac{2}{5}$, $\frac{4}{9}$, $\frac{11}{40}$ (3 marks)</p>	30	<p>The ratio of angles of a triangle is 4:3:2. Find the three angles. (3 marks)</p>
31	<p>Calculate the total surface area of the prism below. (7 marks)</p> 		

32	<p>Solve: (a). $4(x - 1) = 2(x + 4)$ (4 marks)</p> <p>(b). $\frac{x}{3} + 1 = \frac{x - 2}{2}$ (3 marks)</p>
33	<p>120kg of beans costing 200frw per kilogram is mixed with a second type of beans costing 240frw per kilogram. How many kilograms of the second type of beans are needed to make the cost of 1kg of the mixture to be 210frw? (7 marks)</p>
34	<p>Simplify completely: $\left(1\frac{1}{4} - \frac{7}{10}\right) + \left(\frac{2}{3} + \frac{4}{9}\right) - \frac{1}{4}$ (7 marks)</p>
35	<p>The angles of a pentagon are $x, 2x, 2.5x, 3x, 3.5x$. Find the size of each angle. (7 marks)</p>

36 Students were asked to name their favourite subjects at school. The results were as shown below.

Subject	Maths	History	Music	Physics	Religion
Number of pupils	2	4	5	1	3

Draw a histogram, on the graph paper below to show this information. (7 marks)



37 The sum of edges of a cube is 96cm.

Calculate:

(a). The total surface area of the cube. Express your answer in dm^2 . (5 marks)

(b). The volume of the cube. (2 marks)

MATHEMATICS PLE 2007 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

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Sector

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School

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Pupil

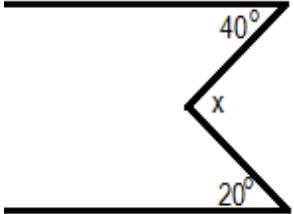
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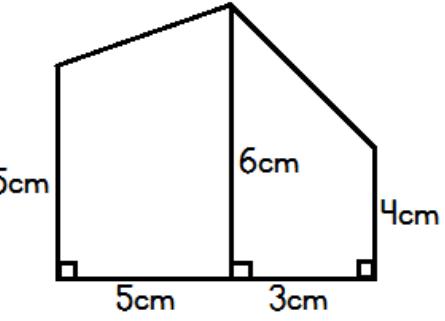
PUPIL'S FULL NAME

Sur name : _____

Other names : _____

1	Simplify completely $\left(\frac{5}{6} \times 2\right) \div \frac{1}{9}$ (2 marks)	2	Calculate $\frac{2}{3}$ of 900g and give your answer in kg (2 marks)
3	Express 858 as a product of its prime factors. (2 marks)	4	Solve: $3m + 4 = 5m - 2$ (2 marks)
5	Write 1960 in Roman numerals. (2 marks)	6	Find the Lowest Common Multiple of 21, 45 and 50. (2 marks)
7	Calculate the volume of a cube whose total surface area is 150cm ² . (2 marks)	8	Remove the brackets and simplify $5(2y + x) + 2(x - 4y)$ (2 marks)

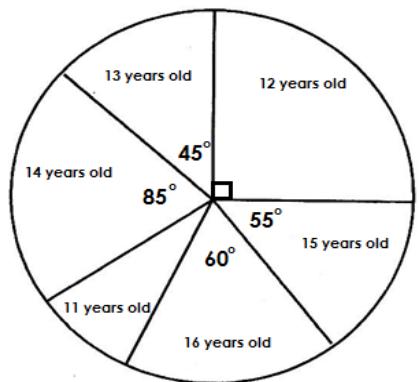
9	Find the value of angle marked x (2 mks) 	10	Complete the table below (2 marks) <table border="1"><tr><td>2</td><td>_____</td><td>8</td><td>12</td></tr><tr><td>5</td><td>17</td><td>65</td><td>_____</td></tr></table>	2	_____	8	12	5	17	65	_____
2	_____	8	12								
5	17	65	_____								
11	The sum of three consecutive odd numbers is 57. Find those three numbers (2 marks)	12	Simplify completely: $\frac{3.2 \times 2.8}{0.7 \times 8}$ (2 marks)								
13	What number when increased by 15% becomes 3450? (2 marks)	14	Complete: (2 marks) 1hour 3minutes 2seconds = ___seconds								
15	A book costing 2400frw is sold at 2640frw. Calculate its percentage profit (2 marks)	16	Show that 70470 is exactly divisible by 9 without using long division. (2 marks)								
17	Find the value of $m^2 + 2ab - n$ if $m = 2, b = -1, a = 3$ and $n = -4$ (2 marks)	18	Share 28 000frw between John and Peter in the ratio of 2:3 respectively. (2 marks)								
19	One interior angle of a regular polygon is 120°. How many sides does the polygon have? (2 marks)	20	The volume of a substance is 60m ³ and its density is 1.26kg/m ³ . Find the mass of the substance (2 marks)								

21	<p>The speed of a moving car is 60km/hr. The car maintains this speed for 1hour 20 minutes. What is the distance travelled by the car? (2 marks)</p>	22	<p>A chapter in a Mathematics text book is printed from page 141 to 212. How many pages is this chapter printed on? (2 marks)</p>
23	<p>Calculate the area of a triangle whose base is 7cm and height is 16cm. (2 marks)</p>	24	<p>5 men take 4 days to paint a house. How many days will 8 men take to paint the same house? (Assuming all men work at the same rate) (2 marks)</p>
25	<p>Write the next two numbers in the sequence below: (2 marks)</p> <p>2, 4, 12, 48, _____, _____</p>	26	<p>A car travels 35km on 2.5 litres of petrol. How much does it cost to travel 280km if the cost of 1 litre of petrol is 600frw? (3 marks)</p>
27	<p>How many revolutions does a bicycle wheel of 70cm diameter make to cover a distance of 8.8km? $(\pi = \frac{22}{7})$ (3 marks)</p>	28	<p>Calculate the area of the figure below (3 marks)</p> 

29	<p>The cost of 3kg of potatoes and 4kg of beans is 840frw. The cost of 1kg of beans is 70frw more than the cost of 1kg of potatoes. Find the cost of 1kg of beans. (3 marks)</p>	30	<p>The simple interest on a capital of 800 000frw after 3 months is 12 000frw. Find the interest rate per year. (3 marks)</p>
31	<p>The diagonals of a rhombus are 10cm and 24cm.</p> <p>(a). Calculate the area of the rhombus. (3 marks)</p> <p>(b). Calculate the perimeter of the rhombus. (4 marks)</p>		
32	<p>Simplify completely: $\frac{\frac{1}{5} \times \left(6\frac{3}{4} - 4.75\right) \times \left(3.875 - 2\frac{3}{8}\right)}{(1.5 \times 1.5) \div 2\frac{1}{2}} \quad (7 \text{ marks})$</p>		
33	<p>David sold cars with a total value of 90 000 000frw for the importer. He received a 10% commission on the first 50 000 000frw and 3% on the rest. How much money does the importer receive if he pays a tax of 5%?</p>		
34	<p>(a). Solve: $\frac{2x-4}{x} - \frac{6x+2}{2x} = 0 \text{ if } x \text{ is not equal to 0.}$</p> <p>(b). The product of a number with four is equal to the sum of that number with 6. Find that number.</p>		

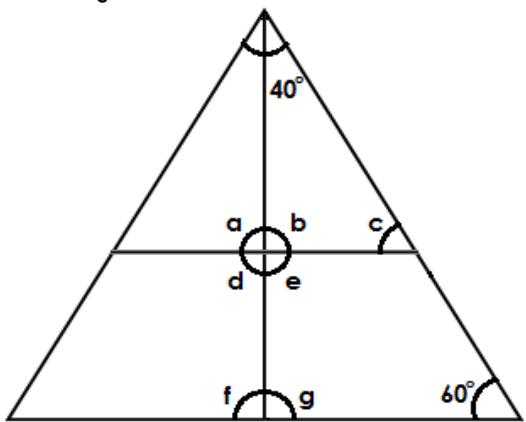
35 The pie chart below shows different ages of pupils in a certain primary school.

(a) If 10 students have 11 years each, how many pupils are represented in the pie chart?

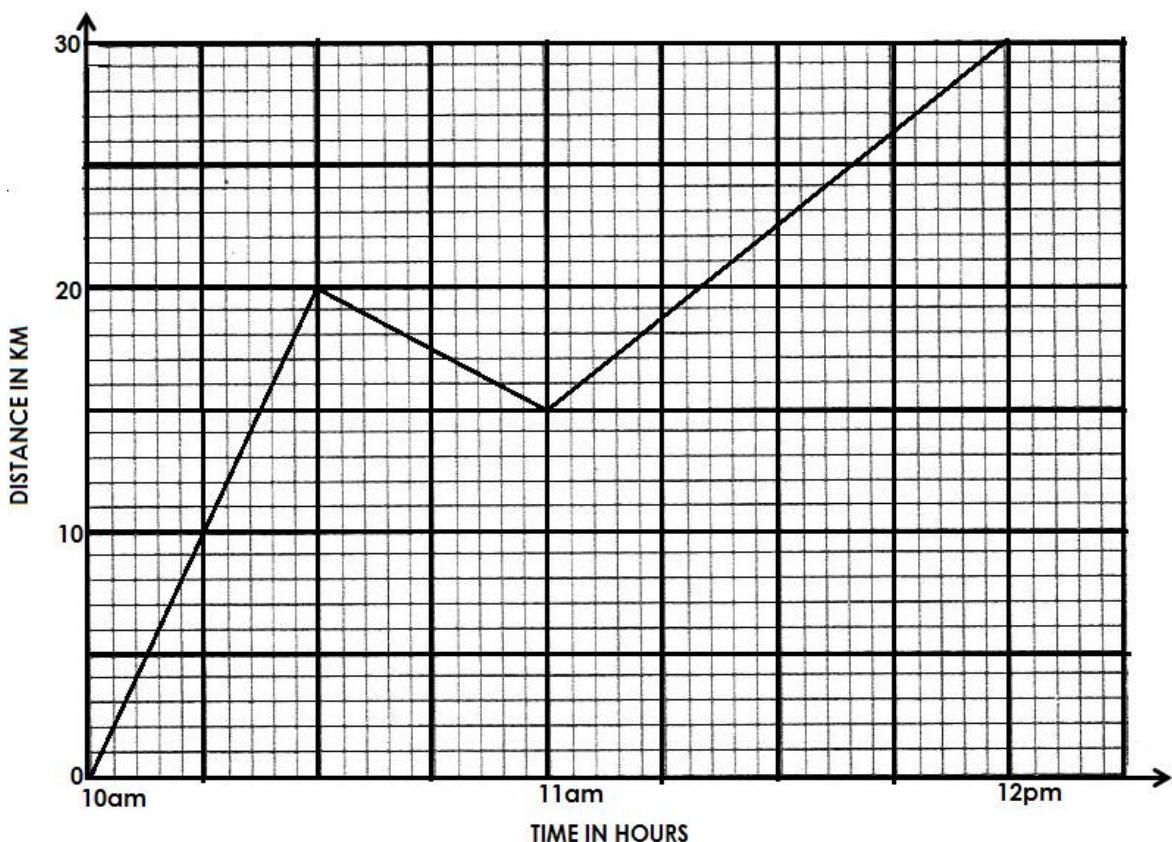


12 years old	13 years old	14 years old	15 years old	16 years old

36 In the figure below, find the measure of unknown angles marked with letters. (7 marks)



37 The graph below shows a journey of a person who visited a friend in another village.



(a). How far did the person travel after 15 minutes?

(b). At what time did the person turn back towards his home?

(c). What distance does the person travel towards his home after turning back?

(d). How far was the person from his home 1 hour after starting the journey?

(e). Find the average speed for the whole journey

MATHEMATICS PLE 2006 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

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District

--	--

Sector

--	--

School

--	--

Pupil

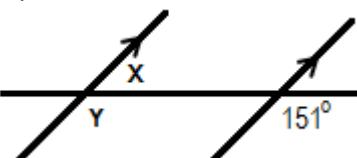
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PUPIL'S FULL NAME

Sur name : _____

Other names : _____

1	Calculate $(0.25 \times 600) + \left(40 \div \frac{5}{8}\right)$ (2 marks)	2	From the diagram below, find the size of angle x and y. (2 marks)
3	A car travels 100km in $1\frac{1}{3}$ hours. Find its average speed. (2 marks)	4	Solve: $2x - 4 = 5x - 10$ (2 marks)
5	Simplify: $1\frac{5}{6} - \frac{7}{12}$ (2 marks)	6	Calculate the LCM of 15, 24 and 30 (2 marks)
7	Simplify: $4a^2b^3 + 2ab^2$ (2 marks)	8	The sum of two numbers is 48 and their difference is 12. What are the two numbers? (2 marks)



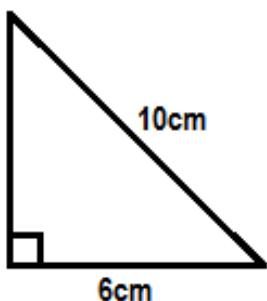
<p>9 Find the size of angle a below. (2 marks)</p> 	<p>10 What are the missing numbers in the calculation below? (2 marks)</p> $ \begin{array}{r} 3 \quad \dots \quad 6 \quad \dots \\ - \quad \dots \quad 7 \quad \dots \quad 5 \\ \hline 2 \quad 2 \quad 5 \quad 9 \end{array} $								
<p>11 Arrange these fractions in ascending order $0.54, \frac{2}{3}, \frac{32}{80}$ (2 marks)</p>	<p>12 Write in short form: (2 marks) $3(x - 2y) - 2(x + y) + 15y$</p>								
<p>13 Calculate the HCD of 20, 50 and 70 (2 marks)</p>	<p>14 Simplify: $\frac{\sqrt{625} + \sqrt{225}}{4}$ (2 marks)</p>								
<p>15 Complete the table below: (2 marks)</p> <table border="1"> <tr> <td>10</td><td>5</td><td>2</td><td>1</td></tr> <tr> <td>0.1</td><td>-----</td><td>0.5</td><td>-----</td></tr> </table>	10	5	2	1	0.1	-----	0.5	-----	<p>16 Express the following quantities as a ratio in the lowest terms: 160cm and 5metres. (2 marks)</p>
10	5	2	1						
0.1	-----	0.5	-----						
<p>17 What is the interior angle sum of a 15 sided polygon? (2 marks)</p>	<p>18 Calculate the area of a rectangle whose perimeter is 24cm and width is 2cm shorter than the length. (2 marks)</p>								

19	John made a simple interest of 40 000frw in 2 years at interest rate of 5% per year. How much money did John bank? (2 marks)	20	How many triangles are in the rectangle ABCD below? (2 marks)
21	30 eggs weigh 1800g. How many g would 12 eggs weigh? (2 marks)	22	A map is drawn using a scale of 1cm to 5km. What length on the map represents 2km? (2 marks)
23	The selling price of a bicycle is 54,000Frw and the profit is 20%. What is the cost price? (2 marks)	24	Find the next two numbers in the following sequence. (2 marks) 1, 3, 12, 60, _____, _____
25	A pen and a pencil cost 150frw altogether. 4 pens and 5 pencils cost 650frw. How much would one pencil cost? (pens are of the same type so are the pencils) (2 marks)	26	Gatare banks 50 000frw at 8% per year compound interest. What is the interest for two years? (3 marks)
27	Suzan pays 1000frw for 2kg of sugar after a shopkeeper reduces the price by 20% per kg. What is the original price of 1 kg of sugar? (3 marks)	28	The perimeter of a semi-circle is 36cm. Calculate the area of the semi-circle. $(\pi = \frac{22}{7})$ (3 marks)
29	A path of 40m long and 12 m wide is to be covered with square tiles of side 20cm. What is the number of tiles needed? (3 marks)	30	100kg of beans costing 180f/kg are mixed with 200kg of another type costing 150f/kg. What is the cost of 1kg of the mixture? (3 marks)

31 The figure below is of a right angled triangle. (7 marks)

(a). Calculate it's perimeter

(b). Calculate it's area



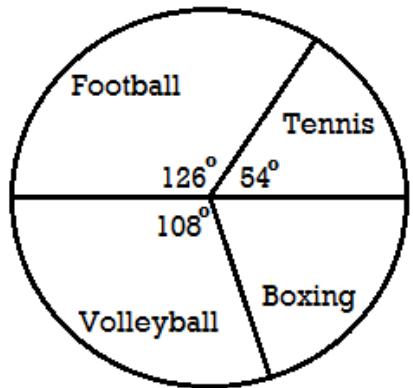
32 (a). Solve: $\frac{x+1}{4} = \frac{x+3}{5}$ (4 marks)

(b). Use the answer from part (a) question and find the value of: $\frac{x^2 - 2x - 14}{x}$ (3 marks)

33 A hollow pipe of length 10m has an inner diameter of 40cm and an outer diameter of 44cm. Calculate the volume of the pipe material. ($\pi = 3.14$) (7 marks)

34 A water tap can fill a tank in 5 hours. A second water tap can fill the tank in 7 hours. How long would the two taps take to fill the tank if they are turned on at the same time? (7 marks)

35 40 students were asked their favourite sports. The Pie chart represents the angles for the various sports. Find the number of students who like each sport. (7 marks)



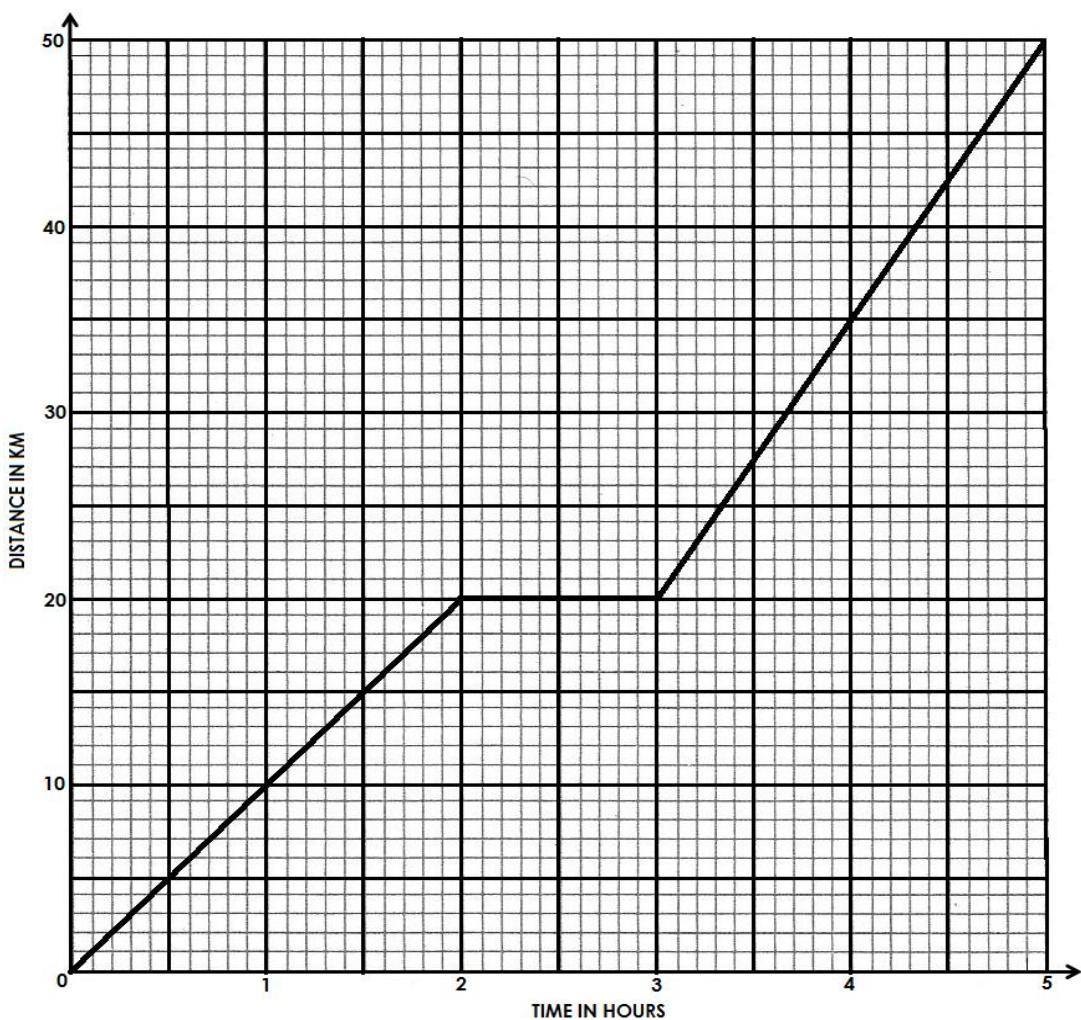
36 A hotel uses 10kg of rice per day. The cost of rice per kg is 600frw.

(a). How many kg of rice does the hotel use per week? (2 marks)

(b). How much money does the hotel pay for rice per week? (2 marks)

(c). The hotel budget for rice per week is 50 000frw. What percentage of money is not used per week? (3 marks)

37 The graph below shows the movement of a car



From the graph answer the following questions.

(a). How far has the car travelled in 6 minutes? (1 mark)

(b). What time does the car take to travel 15km? (1 mark)

(c). For how long does the car stop? (1 mark)

(d). Find the average speed of the car. (4 marks)

MATHEMATICS PLE 2005 EXTRACT

PUPIL'S COMPLETE INDEX NUMBER

Province/city

<input type="text"/>	<input type="text"/>
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District

<input type="text"/>	<input type="text"/>
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Sector

<input type="text"/>	<input type="text"/>
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School

<input type="text"/>	<input type="text"/>
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Pupil

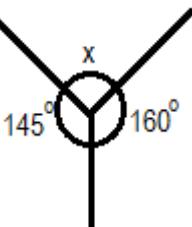
<input type="text"/>	<input type="text"/>	<input type="text"/>
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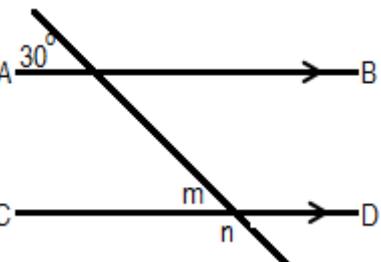
PUPIL'S FULL NAME

Sur name : _____

Other names : _____

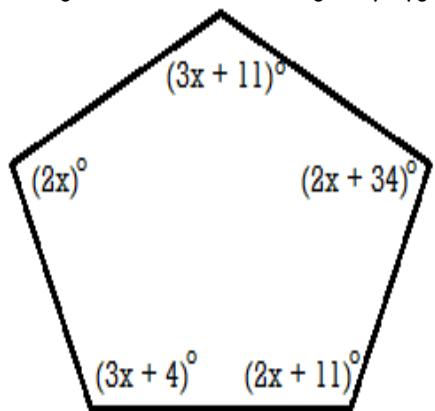
1	Simplify completely: $\left(2\frac{1}{3} \times \frac{9}{14}\right) + \frac{3}{4}$ (2 marks)	2	Solve: $8x - 7 = 2x + 5$ (2 marks)
3	Divide 10 000kg in the ratio 3:7 (2 marks)	4	Calculate the HCF of 45 and 60. (2 marks)
5	Remove the brackets and simplify the following: (2 marks) $4(m - 3n + 3) - 3(m - n + 4)$	6	Find the value of x in the diagram below (2 marks)
7	Calculate the area of a triangle whose height is 10cm and base is 6cm. (2 marks)	8	Divide $0.8 \div 0.05$ (2 marks)



9	Find the simple interest on 240 000frw for 8 months at 5% interest rate per year. (2 marks)	10	Calculate the circumference of a circle whose radius is 5cm. ($\pi = 3.14$) (2 marks)										
11	In the figure below, line AB is parallel to line CD. Find the values of m and n. (2 marks)	12	The volume of a metal is 12cm ³ and it's weight is 96g. Find the density of the metal. (2 marks)										
13	 Calculate: $\frac{1}{9}$ of 162 + 0.2 of 80 (2 mks)	14	The total surface area of a cube is 24cm ² . Calculate the volume of the cube. (2 marks)										
15	A person walks 6km in 50 minutes. Find the speed and express the answer in metres per second. (2 marks)	16	John's salary is increased by 3%. Calculate his new salary if the salary increase is 9000frw. (2 marks)										
17	Write the next two numbers in the sequence: 2, 5, 10, 17, 28, _____, _____ (2 marks)	18	A trader pays 60 000frw for a bicycle and then sells it at 75 000frw. Find the percentage profit. (2 marks)										
19	Calculate the perimeter of a rhombus whose side is 5cm. (2 marks)	20	The average of 3, 5, 7, 8 and x is 5. Find the value of x (2 marks)										
21	A tray of 30 eggs costs 1500frw. Calculate the cost of a dozen eggs. (2 marks)	22	Complete the table below. (2 marks)										
			<table border="1"> <tr> <td>2</td><td>4</td><td>5</td><td>_____</td><td>10</td></tr> <tr> <td>5</td><td>9</td><td>_____</td><td>19</td><td>21</td></tr> </table>	2	4	5	_____	10	5	9	_____	19	21
2	4	5	_____	10									
5	9	_____	19	21									

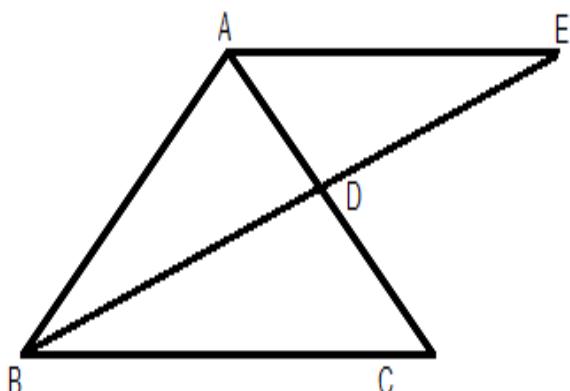
31 The marks of 25 pupils in a test marked out of ten are:
 5, 5, 4, 1, 5, 1, 5, 1, 3, 7, 5, 4, 6, 4, 2, 0, 3, 7, 5, 4, 4, 0, 5, 0, 3.
 (a). Draw a frequency table using this information. (4 marks)
 (b). Calculate the average mark. (3 marks)

32 The figure below is of an irregular polygon. Find the size of each angle (7 marks)



33 A trader banks 250 000frw at 9% per year compound interest rate. The interest is calculated every 4 months. Find the amount of money in the bank at the start of the year. (7 marks)

34 In the figure below, triangle ABC is an equilateral triangle, BE bisects angle ABC, AB = 10cm and AD = DE.



(a). Find the size of angles:

(i). $ABD =$

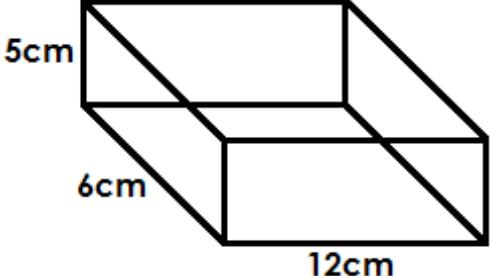
(ii). $ADB =$

(iii). $DAE =$

(b). How long is line AD?

(c). Calculate the area of triangle BCD if $BD = 8.7\text{cm}$.

(d). Find the size of angle BAE.

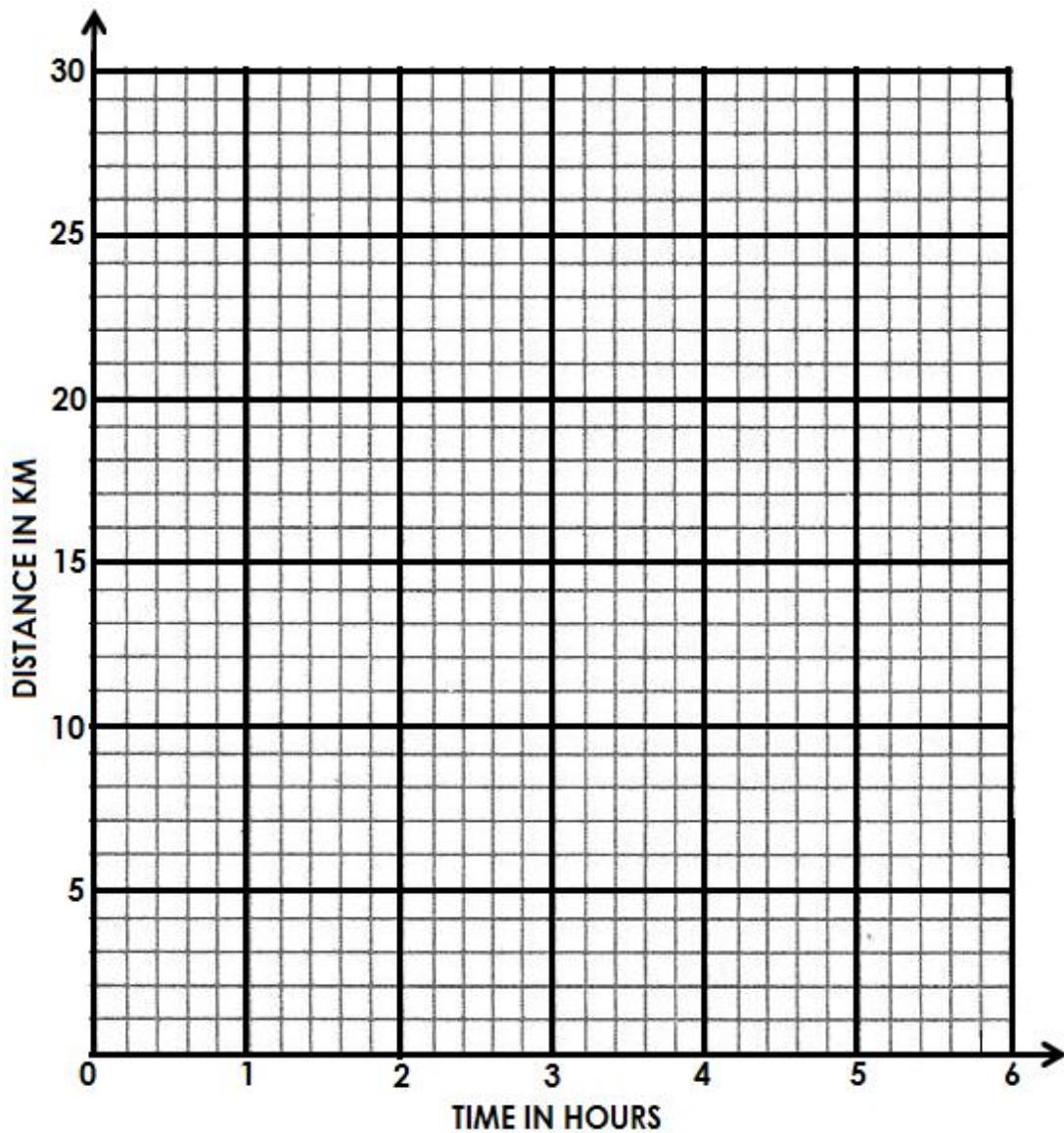
35	<p>A cyclist leaves town A for town B at 8 : 00am and travels at a speed of 15km/hr. 2 hours later, a motorist leaves town A for town B travelling at an average speed of 45km/hr. The motorist follows the same road as the cyclist.</p> <p>(a). How far from town A does the motorist overtake the cyclist? (5 marks)</p> <p>(b). At what time does the motorist overtake the cyclist? (2 marks)</p>
36	<p>The figure below is of a model of a cuboid made out of a paper.</p> <p>(a). Sketch it's net (2 marks)</p>  <p>Calculate the;</p> <p>(b) total surface area of the cuboid (3 marks)</p> <p>(c). volume of the cuboid (2 marks)</p>

37

The table below shows the time taken and distance covered for a person travelling at a constant speed.

Time(hours)	1	3	5	6
Distance(km)	5	15	25	30

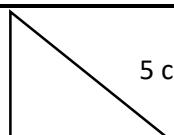
(a). Use the table and draw the graph of this movement. Use the graph paper below.
(5 marks)



(b). Find the time taken to cover 23km from the graph. (1 mark)

(c). Find the distance covered in 1 hour 24 minutes.(1 mark)

WORKING & ANSWERS FOR PLE 2021

1	Twenty nine millions, eight hundred two thousand, six hundred four	2	Ten thousand	3	87000																																								
4	a) -32 , b) +4	5	<table border="1"> <tr><td>2</td><td>6</td><td>12</td><td>18</td></tr> <tr><td>2</td><td>3</td><td>6</td><td>9</td></tr> <tr><td>3</td><td>3</td><td>3</td><td>3</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>3</td></tr> <tr><td></td><td>1</td><td>1</td><td>1</td></tr> </table> $\text{LCM} = 2 \times 2 \times 3 \times 3 \\ = 36$	2	6	12	18	2	3	6	9	3	3	3	3	3	1	1	3		1	1	1	6	=3																				
2	6	12	18																																										
2	3	6	9																																										
3	3	3	3																																										
3	1	1	3																																										
	1	1	1																																										
7	$(3 * x * x * y) - (x * y)$ $(3 * -2 * -2 * -1) - (-2 * 4)$ $-12 + 8$ -4	8	$6kg = 2760 \text{ frw}$ $1kg = \frac{2760}{6} \text{ frw}$ $12kg = \frac{2760}{6} \times 12 \text{ frw}$ $= 5520 \text{ frw}$	9	$100\% - 14\% \\ = 86\%$ $\frac{86}{100} \times 8000$ 1 $= 6880$																																								
10	$(9x5) + 2 = 47$ $\frac{47}{5} = 9.4$	11	<table border="1"> <thead> <tr><th></th><th>kg</th><th>hg</th><th>dag</th><th>g</th><th>dg</th><th>cg</th><th>mg</th></tr> </thead> <tbody> <tr><td>2</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td>2</td><td>3</td><td>0</td><td>0</td><td></td><td></td><td></td></tr> <tr><td>5</td><td>2</td><td>3</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table> $= 52300 \text{ g} = 52300000 \text{ mg}$		kg	hg	dag	g	dg	cg	mg	2	3							5	0							5	2	3	0	0				5	2	3	0	0	0	0	0	12	= $3a^2b^2$
	kg	hg	dag	g	dg	cg	mg																																						
2	3																																												
5	0																																												
5	2	3	0	0																																									
5	2	3	0	0	0	0	0																																						
13	$\frac{1}{2}x\frac{1}{2} = \frac{1}{4}, \frac{1}{4}x\frac{1}{2} = \frac{1}{8}$ $\frac{1}{8}x\frac{1}{2} = \frac{1}{16}, \frac{1}{16}x\frac{1}{2} = \frac{1}{32},$ $\frac{1}{32}x\frac{1}{2} = \frac{1}{64}$ $\text{so the answers are } \frac{1}{32}, \frac{1}{64}$	14	$(84x100):4$ $\frac{8400}{4}$ $= 2100$	15	<table border="1"> <tr><td>2</td><td>72</td></tr> <tr><td>2</td><td>36</td></tr> <tr><td>2</td><td>16</td></tr> <tr><td>3</td><td>9</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td></td><td>1</td></tr> </table> $= 2 \times 2 \times 2 \times 3 \times 3$	2	72	2	36	2	16	3	9	3	3		1																												
2	72																																												
2	36																																												
2	16																																												
3	9																																												
3	3																																												
	1																																												
16	$\frac{13}{4} - \frac{19}{8} = \frac{26 - 19}{8} = \frac{7}{8}$	17	$120 \text{ shelves} \times 98 \text{ books on each} \\ = 11760 \text{ books}$	18	$2000 \times 5 = 10000 \text{ frw}$ $5000 \times 2 = 10000 \text{ frw}$ $500 \times 20 = 10000 \text{ frw}$ $\text{Total} = 30000 \text{ frw}$																																								
19	$C = \pi D$ $C = 3.14 \times 48$ $= 150.72 \text{ cm}$	20	$\text{square of } 16$ $16 \times 16 = 256$	21	$90^\circ - 60^\circ = 30^\circ$																																								
22	$= (5x5) + (4x4x4x4)$ $= 25 + 256$ $= 281$	23	$18000 \text{ secs} : 60 = 300 \text{ mins}$ $300 \text{ mins} : 60 = 5 \text{ hours}$ $= 5 \text{ hours } 00 \text{ minutes}$	24	$= \frac{20 + 25}{10}$ $= \frac{45}{10} = 4.5$																																								
25	$2x - 1 = 5x - 10$ $-1 + 10 = 5x - 2x$ $\frac{3}{1} = \frac{3x}{1}, \text{ therefore } x = 3$	26	 $a^2 + b^2 = c^2$ $3^2 + b^2 = 5^2, b^2 = 25 - 9 = 16$ $b^2 = \sqrt{16}, b = 4 \text{ cm}$	27	$\text{let the number be } x$ $20\% \text{ of } x = 60$ $x = \frac{60 \times 100}{20}$ $x = 300$ $\text{therefore the number is 300.}$																																								

28	a) $2 + 3 = 5$ $Boys = \frac{2}{5} \times 60 = 24 \text{ boys}$ b) $Girls = \frac{3}{5} \times 60 = 36 \text{ girls}$	29	let her salary be x $\frac{5}{100} x = 125 000 \text{ r wf}$ $x = \frac{125 000 \times 100}{5} = 2 500 000 \text{ R wf}$ Therefore her salary is 2 500 000 r wf	30	$D = S \times T$ $D = \frac{90 \text{ km}}{\text{hr}} \times 6 \text{ hr}$ $D = 540 \text{ Km}$																																		
31	a) $int \ angle = \frac{360^0}{5} = 72^0$ b) <i>six sides</i> c) $int \ angle = \frac{360^0}{6} = 60^0$	32	a) $SI = PRT$, $P = \frac{144 000 \times 100}{54}$, <i>Principal</i> = 266 666.667 r wf b) $\frac{809}{100}$		$144 000 = Px \frac{6}{100} \times 9$																																		
33	a) i) $L = CP - SP$, $L = 6000RW - 5000 RWF$ $= 1000 RWF$ ii) $\% Loss = \frac{L}{CP} \times 100$ $= \frac{1000 \times 100}{6000}$ $= 16.67\%$ b) $SI = PRT$, $SI = 48 000 000 \times \frac{6}{100} \times \frac{3}{12}$ $SI = 720 000 RFW$	34	Question interpretation <table border="1"> <thead> <tr> <th>Type</th> <th>Kg</th> <th>Price</th> <th>Product</th> </tr> </thead> <tbody> <tr> <td>1st</td> <td>4</td> <td>900 r wf</td> <td>3 600 r wf</td> </tr> <tr> <td>2nd</td> <td>x</td> <td>700 r wf</td> <td>700x r wf</td> </tr> <tr> <td>Mixture</td> <td>(x+4) kg</td> <td>800 r wf</td> <td>800 (x+4) r wf</td> </tr> </tbody> </table> $3600 + 700x = 800(x + 4)$ $3600 + 700x = 800x + 3200$ $3600 - 3200 = 800x - 700x$ $\frac{400}{100} = \frac{100x}{100}$ <p>therefore $x = 4 \text{ kg}$, so is the second type.</p>	Type	Kg	Price	Product	1 st	4	900 r wf	3 600 r wf	2 nd	x	700 r wf	700x r wf	Mixture	(x+4) kg	800 r wf	800 (x+4) r wf																				
Type	Kg	Price	Product																																				
1 st	4	900 r wf	3 600 r wf																																				
2 nd	x	700 r wf	700x r wf																																				
Mixture	(x+4) kg	800 r wf	800 (x+4) r wf																																				
35	a) <table border="1"> <thead> <tr> <th>Marks</th> <th>No of pupils</th> </tr> </thead> <tbody> <tr><td>10</td><td>1</td></tr> <tr><td>12</td><td>2</td></tr> <tr><td>22</td><td>1</td></tr> <tr><td>23</td><td>3</td></tr> <tr><td>29</td><td>1</td></tr> <tr><td>43</td><td>3</td></tr> <tr><td>50</td><td>1</td></tr> <tr><td>54</td><td>2</td></tr> <tr><td>56</td><td>2</td></tr> <tr><td>64</td><td>1</td></tr> <tr><td>66</td><td>1</td></tr> <tr><td>74</td><td>1</td></tr> <tr><td>76</td><td>2</td></tr> <tr><td>88</td><td>1</td></tr> <tr><td>89</td><td>1</td></tr> <tr><td>90</td><td>1</td></tr> </tbody> </table>	Marks	No of pupils	10	1	12	2	22	1	23	3	29	1	43	3	50	1	54	2	56	2	64	1	66	1	74	1	76	2	88	1	89	1	90	1		b) 24 pupils c) 2 pupils d) 10 pupils e) 90 marks		
Marks	No of pupils																																						
10	1																																						
12	2																																						
22	1																																						
23	3																																						
29	1																																						
43	3																																						
50	1																																						
54	2																																						
56	2																																						
64	1																																						
66	1																																						
74	1																																						
76	2																																						
88	1																																						
89	1																																						
90	1																																						

WORKING & ANSWERS FOR PLE 2019

1	98,754,321	2	-8;-4;-1;+1;+2;+7	3	1- Ten millions																								
4	Two hundred seventy seven million eight hundred eighteen thousands five hundred ninety nine.	5	$48 - (15 + 4) =$ $48 - 18 = 29$	6	$\frac{5}{100} \times 45,000$ $= 2,250$																								
7	$2(x-1) = x - 3$ $2x - 2 = x - 3$ $2x - x = -3 + 2$ $x = -1$	8	76,949 $= 77,000$	9	$2^{\frac{5}{6}} = 1^{\frac{7}{6}}$ $= 2.83$																								
10	$4^3 - \sqrt{100}$ $4 \times 4 \times 4 - 10$ $64 - 10 = 54$	11	$\frac{4.28 + 63.12}{100} \div 0.02$ $= \frac{428 + 6312}{100} = \frac{6740}{100}$ $\frac{6740}{100} \div 2 = \frac{6740}{100} \times \frac{1}{2}$ $= 3370$	12	2, 5, 11, 24, 47, 95 $+3 \quad +6 \quad +12 \quad +24 \quad +48$ $\times 2 \quad \times 2 \quad \times 2 \quad \times 2$																								
13	13) $(\frac{1}{5} + 3\frac{2}{6}) \div \frac{8}{6}$ Bodmas $\frac{1}{5} + \frac{20}{6} = \frac{6}{5} + 100 =$ 30 $\frac{106}{30} = \frac{53}{15}$ $53 \div 8 = \frac{53}{8} \times 6 = 2\frac{13}{20}$ $15 \quad 6 \quad 15 \quad 8$	14	10,500 $\div 50$ $= \frac{10,500}{50}$ $= 210 \text{ books}$	15	$9 \times -6 = -54$																								
16	Twenty one million eight hundred ninety two thousand forty five.	17	$6^6 - 4^6$ $6 \times 6 \times 6 \times 6 \times 6 \times 6 - 4 \times 4$ $\times 4 \times 4$ $= 46656 - 256$ $= 46400$	18	GCF 120 and 96 <table border="1"> <tbody> <tr> <td>2</td> <td>120</td> <td>96</td> </tr> <tr> <td>2</td> <td>60</td> <td>48</td> </tr> <tr> <td>2</td> <td>30</td> <td>24</td> </tr> <tr> <td>2</td> <td>15</td> <td>12</td> </tr> <tr> <td>2</td> <td>15</td> <td>6</td> </tr> <tr> <td>3</td> <td>15</td> <td>3</td> </tr> <tr> <td>5</td> <td>5</td> <td>1</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> </tr> </tbody> </table> $\text{GCF} = 2 \times 2 \times 2 \times 3 = 24$	2	120	96	2	60	48	2	30	24	2	15	12	2	15	6	3	15	3	5	5	1		1	1
2	120	96																											
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2	15	12																											
2	15	6																											
3	15	3																											
5	5	1																											
	1	1																											

19	19) ext + inter = 180° Ext + 80° = 180° Ext = $180^\circ - 80^\circ$ Ext = 100°	20	$P = S + S + S + S + S + S$ $P = 8 + 5 + 6 + 4 + 9 + 2$ $P = 34 \text{ cm}$	21	$12 \times 5000 = 60,000$ $20 \times 1000 = 20,000$ $40 \times 500 = 20,000$ $= 100,000$																									
22	$24 \text{ hrs} = 1 \text{ day}$ $60 \text{ mins} = 1 \text{ hr}$ $24 \times 60 = 1,440 \text{ mins}$	23	$3 \frac{2}{5} + \frac{3}{4} = \frac{17}{5} + \frac{3}{4}$ $= \frac{68}{20} + \frac{15}{20} = \frac{83}{20} = 4 \frac{3}{20}$	24	$C = \pi D \quad D = r \times 2$ $D = 36 \times 2 = 72 \text{ cm}$ $C = 3.14 \times 72$ $= 226.08 \text{ cm}$																									
25	$\frac{1}{2} = 0.5 \quad \frac{2}{5} = 0.4$ $0.05, 0.12, 0.5, 0.55, 0.4$ $= 0.55, \frac{1}{2}, \frac{2}{5}, 0.12, 0.05$	26	12^2 $= 12 \times 12$ $= 144$	27	a) $Y^2 = h^2 + b^2$ $Y^2 = 24^2 + 7^2$ $Y^2 = 576 + 49$ $Y^2 = \sqrt{625}$ $Y = 25 \text{ cm}$ b) $A = B \times H$ $A = \frac{7 \times 24}{2}$ $A = 84 \text{ cm}^2$																									
28	starting time = 8:30 am Duration = $3 \frac{1}{2}$ hrs $D = \frac{7}{2} \times 60 = 210 \text{ mins}$ $210 \div 60 = 3 \text{ hrs } 30 \text{ mins}$ 8:30 <u>+3:30</u> <u>11:60</u> - 60 = 12:00 pm	29	let the salary be x $10\% \text{ of } x = 160,000$ $\frac{100}{100} \times \frac{10x}{10} = \frac{160,000}{100} \times \frac{1}{10}$ $10x = 16,000,000$ $x = 1,600,000$	30	$V = \pi r^2 h$ $V = 3.14 \times 4.4 \times 4.4 \times 8$ $V = 3.14 \times 19.36 \times 8$ $V = 3.14 \times 154.88$ $V = 486.32 \text{ m}^3$																									
31	i) $P = 240,000$ $T = 6 \text{ months}, T = 20\%$ $SI = \frac{PRT}{100}$ $SI = \frac{240,000 \times 20 \times 6}{100 \times 12}$ $SI = 24,000 \text{ frw}$ ii) $\text{Amount} = P + SI$ $A = 240,000 + 24,000$ $A = 264,000 \text{ frw}$ b) i) $\text{Loss} = \text{SP} - \text{CP}$	32	<table border="1"> <thead> <tr> <th>Item</th> <th>Unit price</th> <th>Quantity</th> <th>Total amount</th> </tr> </thead> <tbody> <tr> <td>1. rice</td> <td>1000</td> <td>10</td> <td>$1000 \times 10 = 10,000$</td> </tr> <tr> <td>2. Meat</td> <td>3,000</td> <td>20</td> <td>$3,000 \times 20 = 60,000$</td> </tr> <tr> <td>3. Oil</td> <td>1,500</td> <td>5</td> <td>$1,500 \times 5 = 7,500$</td> </tr> <tr> <td>4. Irish</td> <td>300</td> <td>15</td> <td>$300 \times 15 = 4,500$</td> </tr> <tr> <td></td> <td></td> <td></td> <td>$\text{Total} = 82,000 \text{ frw}$</td> </tr> </tbody> </table>				Item	Unit price	Quantity	Total amount	1. rice	1000	10	$1000 \times 10 = 10,000$	2. Meat	3,000	20	$3,000 \times 20 = 60,000$	3. Oil	1,500	5	$1,500 \times 5 = 7,500$	4. Irish	300	15	$300 \times 15 = 4,500$				$\text{Total} = 82,000 \text{ frw}$
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			$\text{Total} = 82,000 \text{ frw}$																											

$L = 32,000 - 45,000$ $L = 13,000 \text{frw}$ ii) $\% \text{Loss} = \frac{\text{Loss}}{\text{CP}} \times 100$ $\% \text{Loss} = \frac{13,000}{45,000} \times 100$ $\% \text{loss} = 28.8\%$	ii) $\text{bal} = \text{income} - \text{expenditure}$ $\text{Bal} = 92,000 - 82,000$ $\text{Bal} = 10,000 \text{frw}$ $\text{Range} = 50$																
33) i) $\text{Time} = \frac{\text{Distance}}{\text{speed}}$ eed 2 $T = \frac{480}{30 + 15}$ $T = \frac{480}{45}$ $T = 1 \frac{2}{3} \text{hrs or } 100 \text{ mins}$ $= 1 \text{ hr } 40 \text{ mins}$ $10 : 00 + 1: 40 = 11: 40 \text{ a.m}$ ii) Alan $D = S \times T$ $D = 30 \times \frac{5}{3} = 50 \text{ km}$ ii) Norah $D = S \times T$ $D = 15 \times \frac{5}{3} = 25 \text{ Km}$	34 a) starting time = 8 : 30 am End time = 11: 00 am Time taken/duration = End time - start Duration = 11 : 00 - 8 : 30 Duration = 2hrs 30 mins b) $\text{TSA} = 6S^2$ $\text{TSA} = 6 \times 3^2$ $\text{TSA} = 6 \times 3 \times 3$ $\text{TSA} = 54 \text{ cm}^3$ c) $\text{TSA} = 6S^2$ $96\text{cm}^2 = 6S^2$ $6 \quad 6$ $\sqrt{16} = S^2$ $S = 4 \text{cm}$																
35 a) <table border="1"> <thead> <tr> <th>Marks (x)</th> <th>Frequency(f)</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>4</td> </tr> <tr> <td>30</td> <td>7</td> </tr> <tr> <td>45</td> <td>6</td> </tr> <tr> <td>50</td> <td>2</td> </tr> <tr> <td>65</td> <td>9</td> </tr> <tr> <td>70</td> <td>5</td> </tr> <tr> <td>$\Sigma x = 280$</td> <td>$\Sigma f = 33$</td> </tr> </tbody> </table> b) i) 33 pupils ii) mode = 65 iii) modal frequency = 9 iv) Range = Highest - lowest Range = $70 - 20 = 50$	Marks (x)	Frequency(f)	20	4	30	7	45	6	50	2	65	9	70	5	$\Sigma x = 280$	$\Sigma f = 33$	v) $\text{mean} = \frac{\sum x}{\sum f}$ $\text{Mean} = 280 \div 33$ $\text{Mean} = 8.48$
Marks (x)	Frequency(f)																
20	4																
30	7																
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50	2																
65	9																
70	5																
$\Sigma x = 280$	$\Sigma f = 33$																

WORKING & ANSWERS FOR PLE 2018

1	$ \begin{array}{r} 867523 \\ - 374238 \\ \hline 493285 \end{array} $	2 $2 + 8 + 9 = 19$ 19 is <u>not a multiple</u> of 9 (not divisible by 9). Therefore 289 is not divisible by 9	3 $a + b = 20$ $a + 8 = 20$ $a + 8 - 8 = 20 - 8$ $a = 12$																
4	$ \begin{array}{r} 445,000,000 \\ 584,000 \\ + \quad 409 \\ \hline 445,584,409 \end{array} $	5 $ \begin{array}{r} 412928.92 \\ + \quad 1 \leftarrow \\ \hline 412929.00 \\ = 412929 \end{array} $	6 <table border="1"> <tr> <th>Tm</th><th>M</th><th>Hth</th><th>Tth</th><th>Th</th><th>H</th><th>T</th><th>0</th></tr> <tr> <td>7</td><td>5</td><td>3</td><td>2</td><td>5</td><td>9</td><td>6</td><td>1</td></tr> </table> The place value of 7 is (Tm) <u>Ten millions</u>	Tm	M	Hth	Tth	Th	H	T	0	7	5	3	2	5	9	6	1
Tm	M	Hth	Tth	Th	H	T	0												
7	5	3	2	5	9	6	1												
7	<p>Hint: Follow BODMAS order</p> $ \begin{aligned} &= 3 \times (15 + 5) - 7 \\ &= 3 \times 20 - 7 \\ &= 60 - 7 \\ &= 53 \end{aligned} $	8 Hint: Change 5 litres to millilitres 1 litre = 1000ml 5 litres = (1000×5) ml = 5,000ml	9 $ \begin{aligned} &= -3a - 4b \\ &= -3 \times a - 4 \times b \\ &= -3 \times 2 - 4 \times -3 \\ &= -6 + 12 \\ &= 12 - 6 \\ &= 6 \end{aligned} $																
10	$ \begin{aligned} \text{LCM} &= 60, \quad 0.75 = \frac{75}{100} = \frac{3}{4} \\ &= \frac{3}{10} \times 60 = 18 \dots (2^{\text{nd}}) \\ &= \frac{5}{12} \times 60 = 25 \dots (3^{\text{rd}}) \\ &= \frac{3}{4} \times 60 = 45 \dots (4^{\text{th}}) \\ &= \frac{2}{15} \times 60 = 8 \dots (1^{\text{st}}) \\ \text{Asc. odr} &= \frac{2}{15}, \frac{3}{10}, \frac{5}{12}, 0.75 \end{aligned} $	11 $ \begin{aligned} x - 7 &= 2x - 1 \\ x + 2x &= 1 + 7 \\ 3x &= 6 \\ 3x &= 7 - 1 \\ \frac{3x}{3} &= \frac{6}{3} \\ x &= 2 \end{aligned} $	12 $ \begin{aligned} &= \frac{72}{100} \times \frac{24}{100} \div \frac{48}{100} \\ &= \frac{72}{100} \times \frac{24}{100} \times \frac{100}{48} \\ &= \frac{36}{100} \\ &= 0.36 \end{aligned} $																
13	$ \begin{aligned} &= 2(a - 3) + 4b - 2(a - b - 3) + 5 \\ &= 2a - 6 + 4b - 2a + 2b + 6 + 5 \\ &= \cancel{2a} - \cancel{2a} + 4b + 2b - 6 + 6 + 5 \\ &= 6b + \cancel{6} - \cancel{6} + 5 \\ &= 6b + 5 \end{aligned} $	14 $ \begin{aligned} \text{Int.} + \text{Ext.} &= 180^\circ \\ \text{Ext.} &= 180^\circ - \text{Int.} \\ &= 180^\circ - 145^\circ \\ &= 35^\circ \end{aligned} $	15 $ \begin{aligned} A &= \frac{\text{Apothem} \times \text{Perimeter}}{2} \\ &= \frac{2\text{cm} \times (4\text{cm} \times 5)}{2} \\ &= 20\text{cm}^2 \end{aligned} $																

16	<p>Hint: Add whole numbers first</p> $= 3 + 2 + \left(\frac{5}{7} + \frac{2}{3} \right)$ $= 5 + \left(\frac{15 + 14}{21} \right)$ $= 5 + \frac{29}{21}$ $= 5 + 1 + \frac{8}{21} = 6\frac{8}{21}$	17	$\pi D = 314\text{cm}$ $D = 314\text{cm} \div \pi$ $= 314 \div \frac{314}{100}$ $= 314 \times \frac{100}{314}$ $= 100\text{cm}$	18	$\text{1st} = \frac{\text{Diff.}}{Q-1} = \frac{381}{4-1} = \frac{381}{3} = 127$ $\text{2nd} = (\text{1st} \times Q)$ $= 127 \times 4$ $= 508$
19	$= \frac{\text{Dist.}}{\text{Each step}} = \frac{40\text{dm}}{80\text{cm}}$ $= \frac{(40 \times 10)\text{cm}}{80\text{cm}}$ $= \frac{400\text{cm}}{80\text{cm}} = 5 \text{ steps}$	20	$\begin{array}{r} 18 \\ \sqrt{170} \\ \hline -9 \\ \hline 80 \\ -72 \\ \hline 08 \end{array}$ $= 18\frac{8}{9}$ <p>(each child got 18 books and 8 books remained)</p>	21	$15\text{km} = 1 \text{ hr}$ $1 \text{ km} = \frac{1}{15} \text{ hr}$ $45\text{km} = \frac{1 \times 45}{15} \text{ hr}$ $= 3 \text{ hours}$
22	$r = D \div 2$ $= 28\text{m} \div 2 = 14\text{cm}$ $A = \pi r^2$ $= \frac{22}{7} \times 14\text{m} \times 14\text{m}$ $= 616 \text{ m}^2$	23	<p>Hint: Sum and difference are given</p> $\text{Boys} = \frac{32+10}{2} = \frac{42}{2} = 21$ $\text{Girls} = \frac{32-10}{2} = \frac{22}{2} = 11$	24	$= \frac{12}{100} \times 280,000$ $= 33,600$
25	$= \frac{3}{5} \times 10,000$ $= 6,000\text{Frw}$	26	$= \frac{3}{2} \times 70,000$ $= 105,000\text{Frw}$	27	<p>Hint: Sum and difference are given</p> $\text{Bag} = \frac{75000-15000}{2} = \frac{60000}{2} = 30,000\text{Frw}$ $\text{Sci.bk} = \frac{75000+15000}{2} = \frac{90000}{2} = 45,000\text{Frw}$
28	$I = \frac{PTR}{100} = \frac{600000 \times 2 \times 4}{100}$ $= 48,000\text{Frw}$ $A = P + I$ $= 600,000\text{F} + 48,000\text{F}$ $= 648,000\text{Frw}$	29	<p>(a). Duo decagon</p> <p>(b). Ext $= \frac{360^\circ}{n} = \frac{360^\circ}{8} = 45^\circ$</p> <p>Int $= 180^\circ - \text{Ext}$ $= 180^\circ - 45^\circ$ $= 135^\circ$</p>	30	$W = \frac{A}{L} = \frac{15\text{dm}^2}{50\text{cm}}$ $= \frac{(15 \times 100)\text{cm}^2}{50\text{cm}}$ $= \frac{1500\text{cm}^2}{50\text{cm}}$ $= 30 \text{ cm}$

31 3 parts = 40,000Frw
 1 part = $\frac{40,000\text{Frw}}{3}$
 1 part = 13,333.33
 1 part \approx 13,333Frw

(b). $= 13,333 \times 5$
 $= 66,665\text{Frw}$
 (c). $= 13,333 \times 12$
 $= 159,996\text{Frw}$

4 parts = $13,333 \times 4$
 $= 53,332\text{ Frw}$

32 (a). $= \frac{2}{6} + \frac{1}{5} + \frac{1}{3}$
 $= \frac{10+6+10}{30} = \frac{26}{30} = \frac{13}{15}$
 (b). $= \frac{15}{15} - \frac{13}{15} = \frac{2}{15}$

(c). $= \frac{13}{15} \times 9000$
 $= 7,800$ people
 (d). M $= \frac{1}{5} \times 9000$
 $= 1,800$ men

(e) $= \frac{2}{6} \times 9000$
 $= 3,000$ women
 (f) $= \frac{1}{3} \times 9000$
 $= 3,000$ children

33 (a). $V = \pi r^2 h$
 $= 3.14 \times 1 \times 1 \times 4$
 $= 12.56\text{cm}^3$
 (b). $= \frac{10}{10} - \left(\frac{4}{10} + \frac{3}{10} \right)$
 $= \frac{3}{10}$
 (c). $= \frac{60000 \times 10}{3}$
 $= 200,000\text{Frw}$

34

x	f
30	5
40	8
42	10
50	2
70	4
80	6
312	35

(b). 35 pupils
 (c). 80
 (d). 42
 (e). 5 pupils

35 (a). D = S \times T
 $= 20 \times 3$
 $= 60\text{km}$
 (b). T.D = $60 \times 2 = 120\text{km}$
 (c). T.T = $3 + 1 = 4$ hours
 (d). A.S = $\frac{T.D}{T.T}$
 $= \frac{120 \times 1000}{4 \times 3600}$
 $= 8\frac{1}{3} \text{ m/s}$

WORKING & ANSWERS FOR PLE 2017

1	$ \begin{array}{r} 146391 \\ + 43609 \\ \hline 190000 \end{array} $	2	1cm rep. 15km 10cm rep. (15×10) km 10cm rep. 150km	3	(a).even (b). frequency
4	$ \begin{aligned} V &= L \times W \times H \\ V &= 6m \times 5m \times 4m \\ V &= 120m^3 \\ V &= (120 \times 1000) \\ &\text{litres} \end{aligned} $	5	$ \begin{aligned} T &= (12:00 - 8:00) + 2\text{hr} \\ T &= 4\text{hr} + 2\text{hr} \\ T &= 6\text{hrs} \\ &\text{The Journey took 6 hours} \end{aligned} $	6	Hint: Comp. angles add up to 90° $t^\circ = 90^\circ - 43^\circ$ $= 47^\circ$
7	$ \begin{aligned} &= (246 \times 100) - 246 \\ &= 24,600 - 246 \\ &= 24,354 \end{aligned} $	8	$ \begin{aligned} \text{Av} &= \frac{\text{sum of items}}{\text{number of items}} \\ &= \frac{61 + 52 + 48 + 21 + 58}{5} \\ &= \frac{240}{5} \\ &= 48 \end{aligned} $	9	$ \begin{array}{r} 7,000,000 \\ 700,000 \\ + \quad \quad \quad 7 \\ \hline 7,700,007 \end{array} $
10	$ \begin{aligned} &= 8 \times 1,000 + 5 \times 100,000 \\ &= 8,000 + 500,000 \\ &= 508,000 \end{aligned} $	11	$ \begin{aligned} -23 + 6 &= -17 \\ -17 + 6 &= -11 \\ -11 + 6 &= -5 \\ -5 + 6 &= 1 \\ -23; -17; -11; -5; \end{aligned} $	12	$ \begin{aligned} &= 850 + \left(850 \times \frac{20}{100}\right) \\ &= 850 + 170 \\ &= 1,020 \end{aligned} $
13	Hint: Follow BODMAS $ \begin{aligned} &= (250 + 180) - 15 \div 3 \\ &= 430 - 5 \\ &= 425 \end{aligned} $	14	Hint: Neg. removes the brkts $ \begin{aligned} 3x - 5x + 2 &= 0 \\ -2x + 2 - 2 &= 0 - 2 \\ \frac{-2x}{-2} &= \frac{-2}{-2} \end{aligned} $	15	Hint: Prime numbers are numbers with only two factors i.e one and itself. $ \begin{aligned} &= 2, 3, 5, 7 \end{aligned} $
16	$ \begin{aligned} 1 \text{ ha} &= 100a \\ 0.25\text{ha} &= \frac{25}{100} \times 100 \\ &= 25 \text{ares} \end{aligned} $	17	$ \begin{array}{r} 1 \quad 1\text{two} \\ + \quad 1 \quad 1\text{two} \\ \hline 1 \quad 1 \quad 0\text{two} \end{array} $	18	$ \begin{aligned} n &= \frac{360^\circ}{\text{ext. angle}} \\ &= \frac{360^\circ}{20^\circ} \\ &= 18 \text{ sides} \end{aligned} $
19	$ \begin{aligned} 3720 \div 60 &= 62 \text{ min } 00\text{sec} \\ 62 \div 60 &= 1\text{hr } 2\text{min} \\ \text{Therefore: } 3720\text{sec} &= \underline{1\text{hour}} \\ &\underline{2\text{mins}} \end{aligned} $	20	(a). $A \cap B = \{3, 11, 27\}$ (b). Set B is a <u>subset</u> of set A	21	$ \begin{aligned} (100 - 16)\% &\rightarrow 4,200F \\ 84\% &\rightarrow 4,200F \\ 1\% &\rightarrow \frac{4,200}{84} \\ 100\% &\rightarrow \frac{4,200 \times 100}{84} \\ &\rightarrow 5,000\text{Frw} \end{aligned} $

22	<p>Seventy five and twenty seven hundredths</p> <p>Or: Seventy five point two seven</p>	23	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>624</td><td>208</td></tr> <tr><td>2</td><td>312</td><td>104</td></tr> <tr><td>2</td><td>156</td><td>52</td></tr> <tr><td>2</td><td>78</td><td>26</td></tr> <tr><td>3</td><td>39</td><td>13</td></tr> <tr><td>13</td><td>13</td><td>13</td></tr> <tr><td></td><td>1</td><td>1</td></tr> </table> <p style="display: inline-block; vertical-align: middle; margin-left: 10px;"> $= 16 \times 3 \times$ $= 624$ </p>	2	624	208	2	312	104	2	156	52	2	78	26	3	39	13	13	13	13		1	1	24	$4S = 164m$ $S = (164 \div 4)m$ $S = 41m$ $A = S \times S$ $A = 41m \times 41m$ $A = 1,681m^2$
2	624	208																								
2	312	104																								
2	156	52																								
2	78	26																								
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13	13	13																								
	1	1																								
25	$ \begin{array}{r} 6 . 0 0 0 \\ - 2 . 1 7 4 \\ \hline 3 . 8 2 6 \end{array} $	26	<p>Hint: First reduce all fractions to the lowest terms then use BODMAS</p> $ \begin{aligned} &= \frac{3}{4} \times \frac{2}{3} + \frac{1}{2} \\ &= \frac{1}{2} + \frac{1}{2} = \frac{1+1}{2} = \frac{2}{2} = 1 \end{aligned} $	27	$\text{Side } b = (15m + 6m) = 21m$ $A = \frac{h(a+b)}{2}$ $= \frac{8(15+21)}{2} m^2$ $= (4 \times 36) m^2$ $= 144m^2$																					
28	$8 \text{ guests} = 1 \text{ table}$ $1 \text{ guest} = \frac{1}{8} \text{ table}$ $235 \text{ guests} = \frac{1 \times 235}{8} \text{ tables}$ $= 29 \text{ tables and 3 guest rem.}$ $= 29 + 1 = 30 \text{ tables}$	29	<p>(a). $Ni = \frac{D}{Li} = \frac{5540m}{20m} = 277$</p> <p>(b). $Np = Ni + 1 = 277 + 1$</p>	30	$\text{Each} = (4500 \div 15) = 300F$ $\text{Rest} = (300 + 75) = 375F$ $\text{Paid} = (4500 \div 375) = 12 \text{ chrr}$ $\text{Unable to pay} = 15 - 12 = \underline{\underline{3 \text{ children}}}$																					
31	$\text{TSA} = \pi r(r + l)$ $= 3.14 \times 6 (6 + 10)$ $= 18.84 \times 16$ $= 301.44\text{cm}^2$ <p>Note: first find the height</p> $h = \sqrt{H^2 - b^2}$ $= \sqrt{10^2 - 6^2}$ $= \sqrt{100 - 36}$ $= \sqrt{64 \text{ cm}^2}$ $= 8\text{cm}$ $\text{Vol} = \frac{1}{3} \pi r^2 h$ $= \frac{3.14 \times 6 \times 6 \times 8}{3}$ $= 301.44 \text{ cm}^3$	32	$T = \frac{\text{Product of Time}}{\text{Difference of Time}}$ $= \frac{4 \times 3}{4 - 3} \text{ hrs}$ $= \frac{12}{1} \text{ hrs}$ $= 12 \text{ hours}$	33	<table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>1st</th> <th>2nd</th> <th>mix</th> </tr> </thead> <tbody> <tr> <td>Qty</td> <td>(9-4)</td> <td>4</td> <td>9</td> </tr> <tr> <td>Px/kg</td> <td>n</td> <td>300</td> <td>500</td> </tr> </tbody> </table> $ \begin{aligned} (5 \times n) + (4 \times 300) &= (9 \times 500) \\ 5n + 1200 &= 4500 \\ 5n &= 4500 - 1200 \\ \frac{5n}{5} &= \frac{3300}{5} \\ n &= 660\text{Frw} \end{aligned} $ <p>Therefore the cost of the second type is 660F/kg.</p>		1 st	2 nd	mix	Qty	(9-4)	4	9	Px/kg	n	300	500									
	1 st	2 nd	mix																							
Qty	(9-4)	4	9																							
Px/kg	n	300	500																							
34	<p>(a). $D = S \times T$ $= 60\text{km/hr} \times 3\text{hr}$ $= 180\text{km}$</p> <p>The distance from town A to town B is 180km.</p> <p>(b). $A.S = \frac{\text{Total Distance}}{\text{Total Time Taken}}$ $= \frac{180\text{km} + 180\text{km}}{3\text{hr} + 2\text{hr}}$ $= \frac{360\text{km}}{5\text{hr}}$ $= 72\text{km/hr}$</p>	35	<p>(a). First year</p> $I = \frac{PTR}{100} = \frac{180000 \times 1 \times 10}{100} = 18,000\text{Frw}$ $A = P + I = 180,000 + 18,000 = 198,000\text{Frw}$ <p>Second year</p> $I = \frac{PTR}{100} = \frac{198000 \times 1 \times 10}{100} = 19,800\text{Frw}$ $\text{Compound Interest} = 18,000F + 19,800F = 37,800\text{Frw}$ <p>(b). <u>Amount</u> = <u>Principal</u> + <u>Compound Interest</u> $= 180,000F + 37,800F$ $= 217,800\text{Frw}$</p>																							

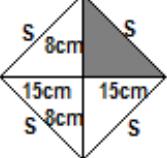
WORKING & ANSWERS FOR PLE 2016

1	$ \begin{array}{r} 594740 \\ \times 1 \\ \hline 595000 \end{array} $	2	Five hundred forty thousand, thirty two	3	$5 \div 11 = 0.45 < 0.677$ Therefore; $\frac{5}{11} < 0.677$
4	$ \begin{array}{r} 39 \times (82 + x) = 39 \times 100 \\ \hline 39 \\ x = 100 - 82 \\ x = 18 \end{array} $	5	$ \begin{array}{r} 24263 \\ + 30200 \\ \hline 54463 \end{array} $	6	$ \begin{array}{r} 2 \times 2 = 4 \\ 4 \times 4 = 16 \\ 16 \times 16 = 256 \\ 256 \times 256 = 65,536 \\ 2; 4; 16; 256; 65536 \end{array} $
7	$ \frac{5}{100} \div \frac{5}{5} = \frac{1}{20} $	8	$ \begin{array}{r} = \frac{a \times a \div b}{c - d} = \frac{3 \times 3 \div 3}{2-5} \\ = \frac{9 \div 3}{3} = \frac{3}{3} = 1 \end{array} $	9	$ \begin{array}{r} (a) = \frac{43,000}{1000} = 43kg \\ (b) = \frac{55}{10} \times 1000 \\ = 5500kg \end{array} $
10	$ \begin{array}{r} C = \pi D \\ C = 3.14 \times (5 \times 2) \\ C = 3.14 \times 10cm \\ C = 31.4cm \end{array} $	11	$ \begin{array}{r} = 1 + \frac{1}{5} \\ = 100\% + \left(\frac{1}{5} \times 100\%\right) \\ = 100\% + 20\% \\ = 120\% \end{array} $	12	$ \begin{array}{r} = \left(\frac{84 \times 100}{2}\right) - 84 \\ = 4200 - 84 \\ = 4116 \end{array} $
13	$ \begin{array}{r} k = 180^\circ - 70^\circ \\ = 110^\circ \end{array} $	14	$ \begin{array}{r} 3x + 6 = 21 \\ 3x = 21 - 6 \\ \frac{3x}{3} = \frac{15}{3} \\ x = 5 \end{array} $	15	$ \begin{array}{r} \begin{array}{cccccc} & & & & & \\ 8 & 3 & 5 & 8 & 7 & 9 \\ & & & & & \end{array} \\ 8 + 5 + 7 = 3 + 8 + 9 \\ 20 = 20 \end{array} $ <p>The sum of numbers in even places should be equal to the sum of numbers in odd places</p>
16	$ \begin{array}{c} \begin{array}{ c c c } \hline 2 & 12 & 168 \\ \hline 2 & 56 & 84 \\ \hline 2 & 28 & 42 \\ \hline 7 & 14 & 21 \\ \hline 2 & 3 & \\ \hline \end{array} \\ = 2 \times 2 \times 2 \times 7 \\ = 56 \end{array} $	17	$ \begin{array}{r} = \frac{4 + 6 + 8 + 10}{4} \\ = \frac{28}{4} \\ = 7 \end{array} $	18	$ \begin{array}{r} P = SP - CP \\ P = 7200 - 6000 \\ P = 1200 \text{ Frw} \\ P = \frac{P \times 100}{cp} = \frac{1200 \times 100}{6000} \\ = 20\% \end{array} $
19	$ \begin{array}{r} (a). \text{Hundreds} \\ (b). \text{Hundredths} \end{array} $	20	$ \begin{array}{r} 5 \text{ bottles} = 4000F \\ 1 \text{ bottle} = \frac{4000}{5}F \\ 3 \text{ bottles} = \frac{4000 \times 3}{5} \\ = 2,400F \end{array} $	21	$ \begin{array}{r} \text{LCD} = 2^4 \\ \frac{3}{8} \times 24 = 9 \dots 2^{\text{nd}} \\ \frac{1}{4} \times 24 = 6 \dots 3^{\text{rd}} \\ \frac{5}{12} \times 24 = 10 \dots 1^{\text{st}} \\ \text{Order} = \frac{5}{12}; \frac{3}{8}; \frac{1}{4} \end{array} $

22	$V = 3m \times 2m \times 3m$ $V = 18m^3$ $\text{Change to dst} = 18 \times 10$ $= 180\text{dst}$	23	$ \begin{array}{r} 7 \text{ hr} & 25 \text{ min} \\ + 1 \text{ hr} & \hline 8 \text{ hr} & 45 \text{ min} \\ + 1 & \hline 9 \text{ hr} & 10 \text{ min} \end{array} $	24	Teacher's guidance																								
25	$ \begin{array}{r} = \frac{10 + 5 - 4}{20} \\ = \frac{15 - 4}{20} \\ = \frac{11}{20} \end{array} $	26	$ \begin{array}{c} 2 \quad 48 \quad 64 \\ 2 \quad 24 \quad 32 \\ 2 \quad 12 \quad 16 \\ 2 \quad 6 \quad 8 \\ 2 \quad 3 \quad 4 \\ 2 \quad 3 \quad 2 \\ 3 \quad 3 \quad 1 \\ \hline 1 \quad & & \end{array} $ $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$ $= 192$	27	$25 \div 3 = 8 \text{ rem } 1$ $8 \div 3 = 2 \text{ rem } 2$ $2 \div 3 = 0 \text{ rem } 2$ $25_{\text{ten}} = 221_{\text{three}}$																								
28	$ \begin{array}{r} \frac{2}{10}x = 40 \\ \frac{1}{5}x = 40 \\ x = 40 \times 2 \\ x = 200 \\ \text{The number is 200.} \end{array} $	29	$ \begin{array}{r} Vol = \frac{\pi r^2 h}{3} \\ = \frac{3.14 \times 6\text{cm} \times 6\text{cm} \times 10\text{cm}}{3} \\ = 376.8\text{cm}^3 \end{array} $	30	$ \begin{array}{r} = 180^\circ(n - 2) \\ = 180^\circ(6 - 2) \\ = 180^\circ \times 4 \\ = 720^\circ \end{array} $																								
31	<p>(a) TSA</p> $ \begin{array}{r} = (2lw) + (2lh) + (2wh) \\ = 2(5 \times 4 + 5 \times 3 + 4 \times 3) \text{ cm}^2 \\ = 2(20 + 15 + 12) \text{ cm}^2 \\ = 2 \times 47 \text{ cm}^2 \\ = 94 \text{ cm}^2 \end{array} $ <p>(b) Vol</p> $ \begin{array}{r} = L \times W \times H \\ = 5\text{cm} \times 4\text{cm} \times 3\text{cm} \\ = 60 \text{ cm}^3 \end{array} $	32	<table border="1"> <thead> <tr> <th>Marks x</th> <th>Frequency f</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>70</td> <td>3</td> <td>210</td> </tr> <tr> <td>60</td> <td>8</td> <td>480</td> </tr> <tr> <td>40</td> <td>1</td> <td>40</td> </tr> <tr> <td>35</td> <td>4</td> <td>140</td> </tr> <tr> <td>15</td> <td>4</td> <td>60</td> </tr> <tr> <td>10</td> <td>5</td> <td>50</td> </tr> <tr> <td>Total</td> <td>Total $f = 25$</td> <td>Total $fx = 980$</td> </tr> </tbody> </table>	Marks x	Frequency f	fx	70	3	210	60	8	480	40	1	40	35	4	140	15	4	60	10	5	50	Total	Total $f = 25$	Total $fx = 980$	(b) 25 pupils	
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WORKING & ANSWERS FOR PLE 2015

1	$ \begin{array}{r} 770,000,000 \\ 818,000 \\ + \quad 555 \\ \hline 770,818,555 \end{array} $	2	$ \begin{aligned} &= (9 \times 9 \times 9) + (4 \times 4 \times 4 \times 4 \times 4) \\ &= 729 + 1024 \\ &= 1753 \end{aligned} $	3	$ \begin{aligned} &= (a \times a \times a) + (3 \times b \times b) \\ &= (2 \times 2 \times 2) + (3 \times 2 \times 2) \\ &= 8 + 12 \\ &= 20 \end{aligned} $
4	$ \begin{array}{r} 59 \\ 15 \quad 80 \quad 75 \\ 16 \text{ hr} \quad 00 \text{ min} \quad 15 \text{ sec} \\ - \quad 8 \text{ hr} \quad 25 \text{ min} \quad 55 \text{ sec} \\ \hline 7 \text{ hr} \quad 34 \text{ min} \quad 20 \text{ sec} \end{array} $	5		6	$ \begin{aligned} 1 \times 6 &= 6 \\ 6 \times 6 &= 36 \\ 36 \times 6 &= 216 \\ 216 \times 6 &= 1296 \end{aligned} $ <p>Hint: Keep multiplying by</p>
7	$ \begin{aligned} 1^{\text{st}} \text{ no.} &= \frac{20+6}{2} = \frac{26}{2} = \\ &13 \end{aligned} $	8	$ \begin{aligned} 4k^\circ + 4k^\circ + 4k^\circ &= 360^\circ \\ 12k^\circ &= 360^\circ \\ \frac{12k^\circ}{12} &= \frac{360^\circ}{12} \\ k &= 30 \end{aligned} $	9	$ \begin{aligned} V &= L \times W \times H \\ &= 10m \times 4m \times 2m \\ &= 80m^3 \end{aligned} $ <p>From m^3 to dast divide by 10 $= (80 \div 10)$ dast $= 8$ dast</p>
10	<p>Part (a)</p> <p>Let Alice's age be x</p> $ \begin{array}{l} x + 4 = 17 \\ x = 17 - 4 \\ x = 13 \text{ years} \end{array} $ <p>Part (b)</p> <p>6 years from now</p> $ \begin{aligned} &= 13 + 6 \\ &= 19 \text{ years old} \end{aligned} $	11	$ \begin{aligned} 100 \text{ pupils} &= 36 \text{ days} \\ 1 \text{ pupil} &= (36 \times 100) \text{ days} \\ 8 \text{ pupils} &= \frac{36 \times 100}{8} \text{ days} \\ &= 45 \text{ days} \end{aligned} $	12	<p>Part (a)</p> $ \frac{60}{100} \times 200 = 120 $ <p>Part (b)</p> $ = \frac{36}{100} \div \frac{4}{4} = \frac{9}{25} $
13	$ \begin{aligned} r &= \frac{D}{2} = \frac{100}{2} = 50 \text{ cm} \\ &\text{Part (a)} \\ A &= \pi r^2 \\ &= \frac{314}{100} \times 50 \text{ cm} \times 50 \text{ cm} \\ &= 314 \times 5 \text{ cm} \times 5 \text{ cm} \\ &= 7850 \text{ cm}^2 \\ &\text{Part (b)} \\ &= (7850 \div 10000) \\ &= 0.785 \text{ m}^2 \end{aligned} $	14	$ \begin{aligned} &= \frac{4}{6} \times \frac{6}{8} \times \frac{6}{2} \\ &= \frac{3}{2} \\ &= 1\frac{1}{2} \end{aligned} $	15	$ \begin{aligned} 1 \text{ cm} &\rightarrow 50,000 \text{ cm} \\ 8 \text{ km} &\rightarrow \frac{8 \text{ km}}{50,000 \text{ cm}} \\ 8 \text{ km} &\rightarrow \frac{800,000 \text{ cm}}{50,000 \text{ cm}} \\ 8 \text{ km} &\rightarrow 16 \text{ cm} \end{aligned} $ <p>Therefore the distance is 16cm</p>
16	$ \begin{aligned} \text{Each share} &= \frac{\text{Total number}}{\text{Total shares}} \\ &= \frac{720}{2+7} = \frac{720}{9} = 80 \text{ pupils} \\ \text{Boys} &= 80 \times 2 = 160 \\ \text{Girls} &= 80 \times 7 = 560 \end{aligned} $	17	<p>Part (a)</p> $ 8 \div 5 = 1 \text{ r } 3 \uparrow $ $ 1 \div 5 = 0 \text{ r } 1 \uparrow $ <p>Therefore the answer is 13_{five}</p> <p>Part (b)</p> $ \begin{array}{r} 110_{\text{two}} \\ + 11_{\text{two}} \\ \hline 1001_{\text{two}} \end{array} $	18	<p>Part (a)</p> $ \begin{aligned} D &= S \times T \\ D &= \frac{30 \text{ km}}{\text{hr}} \times 6 \text{ hr} \\ D &= 180 \text{ km} \end{aligned} $ <p>Part (b)</p> $ \begin{aligned} D &= \frac{T \cdot D}{T \cdot T} = \frac{(180 + 180) \text{ km}}{(6 + 4) \text{ hr}} \\ &= \frac{360 \text{ km}}{10 \text{ hr}} = 36 \text{ km/hr} \end{aligned} $

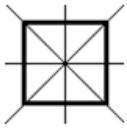
19	<p><u>First number</u> $= \frac{\text{Sum}}{\text{Quot.}+1} = \frac{18}{2+1} = \frac{18}{3} = 6$</p> <p><u>Second number</u> $= (1^{\text{st}} \text{ no.} \times \text{quot.})$ $= (6 \times 2)$ $= 12$</p>	20	<table border="1"> <tr> <th>First</th><th>+</th><th>Second</th><th>=</th><th>Mix</th></tr> <tr> <td>40</td><td>+</td><td>60</td><td>=</td><td>100</td></tr> <tr> <td>300</td><td></td><td>x</td><td></td><td>180</td></tr> </table> $(40 \times 300) + (60 \times x) = (100 \times 180)$ $12,000 + 60x = 18,000$ $60x = 18,000 - 12,000$ $60x = 6,000$ $60x - 6,000$	First	+	Second	=	Mix	40	+	60	=	100	300		x		180	21											
First	+	Second	=	Mix																										
40	+	60	=	100																										
300		x		180																										
22	$P = \frac{I \times 100}{T \times R}$ $= \frac{90,000 \times 100}{3 \times 10}$ $= 300,000 \text{ Frw}$	23	$Fr.\text{fees} = \frac{1}{2} \text{ fr. rem} = \frac{2}{2} - \frac{1}{2} = \frac{1}{2}$ $Fr.\text{food} = \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ $Fr.\text{svd} = 1 - (fr.\text{fees} + fr.\text{fd})$ $= 1 - \left(\frac{1}{2} + \frac{1}{6} \right)$ $= 1 - \left(\frac{3 + 1}{6} \right)$ $= \frac{6}{6} - \frac{4}{6}$ $= \frac{2}{6} = \frac{1}{3} \text{ equivalent to 100,000}$ $= 100,000 \times 3$ $= 300,000 \text{ Frw}$	24																										
25	<p><u>Area</u> $= \frac{D1 \times D2}{2}$ $= \frac{16\text{cm} \times 30\text{cm}}{2}$ $= 8\text{cm} \times 30\text{cm}$ $= 240\text{cm}^2$</p> <p><u>Perimeter</u>  $S = \sqrt{(15 \times 15) + (8 \times 8)}$ $= \sqrt{225\text{cm}^2 + 64\text{cm}^2}$ $= \sqrt{289\text{cm}^2}$ $= 17\text{cm}$ $P = S \times 4$ $= 17\text{cm} \times 4$ </p>	26	<p><u>Area of wall to be painted</u> $A = W \times H$ $= 20\text{m} \times 2.5\text{m}$ $= 50\text{m}^2$ <p><u>Wall paint needed</u></p> $1\text{m}^2 = 0.095 \text{ litres}$ $50\text{m}^2 = (0.095 \times 50)$ $= 4.75 \text{ litres}$ <p><u>Total paint needed</u></p> $= (\text{wall paint}) + (\text{waste})$ $= 100\% + 5\%$ $= 105\%$ $= \frac{105}{100} \times 4.75$ $= 4.9875 \text{ litres}$ <p><u>Cost needed to buy the paint</u></p> $1\text{l} = 3000\text{Frw}$ $4.9875\text{l} = (4.9875 \times 3000)\text{F}$ $= 14962.5\text{F}$ $\approx 14963\text{F} \approx 15,000\text{F}$ </p>	27																										
29	<table border="1"> <thead> <tr> <th>Marks x</th><th>Frequency f</th><th>$f \times x$</th></tr> </thead> <tbody> <tr> <td>0</td><td>4</td><td>$(0 \times 4) = 0$</td></tr> <tr> <td>1</td><td>11</td><td>$(1 \times 11) = 11$</td></tr> <tr> <td>2</td><td>6</td><td>$(2 \times 6) = 12$</td></tr> <tr> <td>3</td><td>3</td><td>$(3 \times 3) = 9$</td></tr> <tr> <td>4</td><td>2</td><td>$(4 \times 2) = 8$</td></tr> <tr> <td>5</td><td>1</td><td>$(5 \times 1) = 5$</td></tr> <tr> <td>6</td><td>2</td><td>$(6 \times 2) = 12$</td></tr> <tr> <td>Total</td><td>Total $f = 29$</td><td>Total $fx = 57$</td></tr> </tbody> </table>	Marks x	Frequency f	$f \times x$	0	4	$(0 \times 4) = 0$	1	11	$(1 \times 11) = 11$	2	6	$(2 \times 6) = 12$	3	3	$(3 \times 3) = 9$	4	2	$(4 \times 2) = 8$	5	1	$(5 \times 1) = 5$	6	2	$(6 \times 2) = 12$	Total	Total $f = 29$	Total $fx = 57$	<p>(b). Mean = $\frac{\sum f x}{\sum f}$</p> $= \frac{57}{29}$ $= 1.97$ $= 2$ <p>(c). Mode = 1</p>	<p>(a).={i , 0 , 6 , 5 , t , j , 4 , a , m }</p> <p>(b).={a , m , j , 4 , d , f , e , k , g }</p> <p>(c).={5 , t , j , 4 }</p> <p>(d).={i,0,6,a,m,j,4,5,t,1,n,d,f,3}</p> <p>(e).={j , 4 , d , f }</p> <p>(f).={j , 4 }</p> <p>(g).={5 , 6 , j , 4 , a , m }</p>
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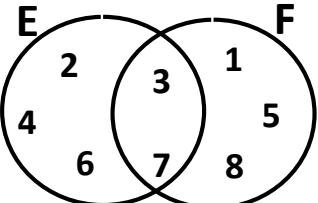
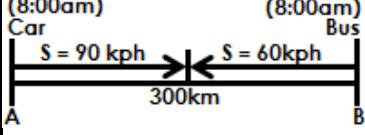
WORKING & ANSWERS FOR PLE 2014

1	$ \begin{array}{r} 563,091 \\ + 36,909 \\ \hline 600,000 \end{array} $	2	(a). Thousands (b). 6,000,000 $ \begin{array}{r} 800,000 \\ + 26 \\ \hline 6,800,026 \end{array} $	3	$ = \sqrt{\frac{225}{100}} = \frac{15}{10} = 1.5 $
4	$ \begin{aligned} 0.2\text{hm}^2 &= \frac{2}{10} \times 10000 = 2000\text{m}^2 \\ 4\text{dam}^2 &= 4 \times 100 = 400\text{m}^2 \\ &= 2000\text{m}^2 - 400\text{m}^2 \\ &= 1600\text{m}^2 \end{aligned} $	5	10 three = $(1 \times 3^1) + (0 \times 3^0)$ = 3ten $ \begin{array}{ c c c } \hline B & N & R \\ \hline 2 & 3 & 1 \\ \hline 2 & 1 & 1 \\ \hline 0 & & \\ \hline \end{array} $ $ \begin{array}{r} 101\text{two} \\ + 11\text{two} \\ \hline 1000\text{two} \end{array} $	6	$ \begin{array}{r} 1\text{hr} = 60\text{min} \\ 1\text{h} \quad 90\text{min} \\ 2\text{h} \quad 30\text{min} \\ -1\text{h} \quad 45\text{min} \\ \hline 0\text{h} \quad 45\text{min} \end{array} $ <p>Minutes $60 + 30 = 90$ $90 - 45 = 45$ Hours $2 - 1 = 1$ $1 - 1 = 0$</p>
7	$ \begin{aligned} 4x + x &= 360^\circ - 90^\circ \\ 5x &= 270^\circ \\ 5x &= 270^\circ \\ \frac{5}{5} &= \frac{5}{5} \\ x &= 54^\circ \end{aligned} $	8	$ \begin{aligned} & \frac{\text{sum of items}}{\text{number of items}} \\ & = \frac{9 + 3 + 1 + 8 + 4 + 5}{6} = \frac{30}{6} = 5 \end{aligned} $	9	(a) Rectangle has <u>2</u> lines of symmetry (b) Square has <u>4</u> lines of symmetry
10	(a) $x = b$ (Corresponding angles)	11	$ \begin{aligned} 4S &= 18\text{ cm} \\ S &= (18 \div 4)\text{ cm} \\ S &= 4.5\text{ cm} \\ A &= S \times S \\ A &= 4.5\text{ cm} \times 4.5\text{ cm} \\ A &= 20.25\text{ cm}^2 \end{aligned} $	12	$ \begin{array}{ c c } \hline 3 & 105 \\ \hline 5 & 35 \\ \hline 7 & 7 \\ \hline & 1 \\ \hline \end{array} $ $105 = 3 \times 5 \times 7$
13	$ \begin{aligned} 2x - 1 &= 2 - x \\ 2x + x &= 2 + 1 \\ 3x &= 3 \\ \frac{3x}{3} &= \frac{3}{3} \\ x &= 1 \end{aligned} $	14	$ \begin{array}{ c c c c } \hline 3 & 9 & 12 & 15 \\ \hline & 3 & 4 & 5 \\ \hline \end{array} $ <p>HCF = 3 (Only 3 can divide all the three numbers at)</p>	15	Each part = $\frac{40}{(2+3)} = \frac{40}{5} = 8$ Girls = $3 \times 8 = 24$ Boys = $2 \times 8 = 16$
16	Less = $100\% - 60\% = 40\%$ Pupils = $\frac{40}{100} \times 1200 = 480$ Therefore, 480 pupils	17	(a). 1 bk = $(2400 \div 6) = 400\text{F}$ Bks 5000F can buy $= (5000 \div 400) \approx 12$ books (b). Bal = $5000\text{F} - (400 \times 12)$ $= 5000 - 4800 = 200\text{F}$	18	$ \begin{aligned} & = \frac{28}{40} \times 100 \\ & = 70\% \end{aligned} $
19	$ \begin{aligned} 20\text{ l} &\rightarrow 1\text{ min} \\ 1\text{ l} &\rightarrow \frac{1}{20}\text{ min} \\ 6000\text{l} &\rightarrow \frac{1 \times 6000}{20}\text{ min} \\ &\rightarrow 300\text{ min} \\ &\rightarrow \frac{300}{60}\text{ hrs} = 5\text{ hours} \end{aligned} $	20	$ \begin{aligned} & = \frac{3}{5} \times \frac{5}{4} \times \frac{4}{9} \\ & = \frac{1}{3} \end{aligned} $	21	$ \begin{aligned} & = \frac{(4 \times m \times p) + (3 \times n)}{n} \\ & = \frac{(4 \times 3 \times 2) + (3 \times 6)}{6} \\ & = \frac{24 + 18}{6} = \frac{42}{6} = 7 \end{aligned} $
22	Set A = {2, 3, 5, 7, 11, 13} Set B = {1, 3, 5, 7, 9, 11, 13} (a). $A \cap B = \{3, 5, 7, 11, 13\}$ (b) Venn diagram 	23	Teacher's guidance	25	$ \begin{aligned} T.S.A &= 4\pi r^2 \\ 5544\text{cm}^2 &= \frac{4 \times 22r^2}{7} \\ 5544\text{cm}^2 \times 7 &= 88r^2 \\ \frac{5544\text{cm}^2 \times 7}{88} &= \frac{88r^2}{88} \\ r^2 &= 63\text{cm}^2 \times 7 \\ \sqrt{r^2} &= \sqrt{441\text{cm}^2} \\ r &= 21\text{cm} \\ Vol &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3} \times \frac{22}{7} \times 21\text{cm} \times 21\text{cm} \times 21\text{cm} \\ &= 38,808\text{cm}^3 \end{aligned} $
24			$ \begin{aligned} P &= SP - CP \\ &= 66,000 - 55,000 \\ &= 11,000\text{F} \\ \%P &= \frac{P}{CP} \times 100 \\ &= \frac{11,000}{55,000} \times 100 \\ &= 20\% \end{aligned} $		

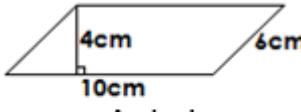
26	<p>(a). Angle <u>ABC</u> = Angle <u>ACB</u> = 45° Angle <u>CAD</u> = $180^\circ - (CDA + ACD)$ = $180^\circ - (90^\circ + 45^\circ)$ = $180^\circ - 135^\circ$ = 45°</p> <p>(b). Triangle ABC is an <u>Isosceles</u> triangle</p>	<p>27</p> <p>$LCD = 300$ $0.42 = \frac{42}{100} \times 300 = 126$.....(iii) $\frac{11}{25} = \frac{11}{25} \times 300 = 132$.....(iv) $\frac{12}{30} = \frac{12}{30} \times 300 = 120$.....(i) $0.41 = \frac{41}{100} \times 300 = 123$.....(ii) Asc. Order = $\frac{12}{30}, 0.41, 0.42, \frac{11}{25}$</p>	<p>28</p> <p>(a). $L = (10 \times 6)m = 60m$ (b). $W = (10 \times 5) = 50m$ (c) $S.A = L \times W$ = $60m \times 50m$ = $3,000m^2$</p>																								
29	$P = \frac{T \times 100}{T \times R}$ $= \frac{20,000 \times 100}{2 \times 10}$ $= 100,000 \text{ Frw}$ $100,000 \text{ Frw}$ $100,000 \text{ Frw}$ $100,000 \text{ Frw}$	31	<p>Part (a)</p> $= 2a^2b - ac$ $= (2 \times a \times a \times b) - (a \times c)$ $= (2 \times 1 \times 1 \times 2) - (1 \times 3)$ $= 4 + 3$ $= 7$ <p>Part (b)</p> <p>(i). Rectangle</p> <p>(ii). Length = Length</p> $3x + 1 = x + 9$ $3x - x = 9 - 1$ $\frac{2x}{2} = \frac{8}{2}$ $x = 4$ <p>Length = $(4 + 9) = 13\text{cm}$</p> <p>Width = $(3 \times 4 - 7) = (12 - 7) = 5\text{cm}$</p> <p>(iii) Perimeter and area</p> $P = 2(L + W)$ $= 2(13\text{cm} + 5\text{cm})$ $= 2 \times 18\text{cm}$ $= 36\text{cm}$ $A = L \times W$ $= 13\text{cm} \times 5\text{cm}$ $= 65\text{cm}^2$																								
30	$A = \frac{h}{2}(a + b)$ $= \frac{4\text{cm}}{2}(14\text{cm} + 6\text{cm})$ $= 2\text{cm} \times 20\text{cm}$ $= 40\text{cm}^2$	32	<p>Part (a)</p> <p>Interest for 1st year</p> $= \frac{P \times T \times R}{100}$ $= \frac{3,000,000 \times 1 \times 5}{100}$ $= 150,000\text{ Frw}$ <p>$A = P + I$</p> $= 3,000,000\text{ Frw} + 150,000\text{ Frw}$ $= 3,150,000\text{ Frw}$ <p>Interest for 2nd year</p> $= \frac{P \times T \times R}{100}$ $= \frac{3,150,000 \times 1 \times 5}{100}$ $= 157,500\text{ Frw}$ <p>C.I = Total interest of (1st yr + 2nd yr)</p> $= 150,000\text{ Frw} + 157,500\text{ Frw}$ $= 307,500\text{ Frw.}$ <p>Part (b)</p> $A = P + C.I$ $= 3,000,000\text{ Frw} + 307,500\text{ Frw}$ $= 3,307,500\text{ Frw.}$																								
33	<p>Part (a)</p> $C = 2\pi r$ $44 = \frac{2 \times 22r}{7}$ $44 \times 7 = 44r$ $\frac{44 \times 7}{44} = \frac{44r}{44}$ $r = 7\text{cm}$	$V = \pi r^2 h$ $= \frac{22 \times 7\text{cm} \times 7\text{cm} \times 10\text{cm}}{7}$ $= 1,540\text{cm}^3$	<p>Part (b)</p> $TSA = 2\pi r^2 + 2\pi rh$ $= \frac{2 \times 22 \times 7 \times 7}{7} + \frac{2 \times 22 \times 7 \times 10}{7}$ $= 308\text{cm}^2 + 440\text{cm}^2$ $= 748\text{cm}^2$																								
34	<p>Part (a)</p> $Vol = \frac{b \times h}{2} \times L$ $= \frac{12\text{cm} \times 5\text{cm}}{2} \times 25\text{cm}$ $= 30\text{cm}^2 \times 25\text{cm}$ $= 750\text{cm}^3$ <p>Part (b)</p> <p>Hypotenuse (H) = $\sqrt{b^2 + h^2}$</p> $= \sqrt{(5 \times 5) + (12 \times 12)}$ $= \sqrt{25\text{cm}^2 + 144\text{cm}^2}$ $= \sqrt{169\text{cm}^2}$ $= 13\text{cm}$ <p>TSA = $(b \times h) + L(b + h + H)$</p> $= (12 \times 5)\text{cm}^2 + 25(5 + 12 + 13)\text{cm}^2$ $= 60\text{cm}^2 + (25 \times 30)\text{cm}^2$ $= 60\text{cm}^2 + 750\text{cm}^2$ $= 810\text{cm}^2$	35	<p>Part (a)</p> <table border="1"> <thead> <tr> <th>Marks, x</th> <th>Frequency, f</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>4</td> <td>32</td> </tr> <tr> <td>10</td> <td>6</td> <td>60</td> </tr> <tr> <td>11</td> <td>3</td> <td>33</td> </tr> <tr> <td>12</td> <td>4</td> <td>48</td> </tr> <tr> <td>15</td> <td>1</td> <td>15</td> </tr> <tr> <td>16</td> <td>2</td> <td>32</td> </tr> <tr> <td></td> <td>Total, $f = 20$</td> <td>Total, $fx = 220$</td> </tr> </tbody> </table> <p>Part (b)</p> <p>Mode mark = 10</p> <p>Part (c)</p> $\text{Mean} = \frac{\text{Total } fx}{\text{Total } f} = \frac{220}{20} = 11$	Marks, x	Frequency, f	fx	8	4	32	10	6	60	11	3	33	12	4	48	15	1	15	16	2	32		Total, $f = 20$	Total, $fx = 220$
Marks, x	Frequency, f	fx																									
8	4	32																									
10	6	60																									
11	3	33																									
12	4	48																									
15	1	15																									
16	2	32																									
	Total, $f = 20$	Total, $fx = 220$																									

WORKING & ANSWERS FOR PLE 2013

1	$ \begin{array}{r} 2,045 \\ 1,055 \\ + 900 \\ \hline 4,000 \end{array} $	2	$ \begin{array}{r} 3,000 \rightarrow \text{Three thousand} \\ + 5 \rightarrow \text{five} \\ \hline 3,005 \rightarrow \text{Three thousand, five} \end{array} $	3	$ \begin{aligned} &= (200 \div 10) + \left(\frac{4}{100} \times 100\right) \text{dag} \\ &= 20 \text{dag} + 4 \text{dag} \\ &= 24 \text{dag} \end{aligned} $								
4	$ \begin{aligned} \text{Angle a} &= 180^\circ - (110^\circ + 30^\circ) \\ &= 180^\circ - 140^\circ \\ &= 40^\circ \end{aligned} $	5	$ \begin{aligned} &= \frac{84}{100} \times 25 \\ &= 21 \end{aligned} $	6	$ \begin{aligned} &= \frac{3}{7} \times \frac{14}{9} \\ &= \frac{2}{3} \end{aligned} $								
7	$ \begin{aligned} 3m &= 5 + 4 \\ 3m &= 9 \\ \frac{3m}{3} &= \frac{9}{3} \\ m &= 3 \end{aligned} $	8	$ \begin{array}{r} 1, 4, 9, \frac{16}{(1 \times 1)} \frac{25}{(2 \times 2)} \frac{25}{(3 \times 3)} \frac{16}{(4 \times 4)} \frac{25}{(5 \times 5)} \end{array} $	9	$ \begin{aligned} \text{Each} &= \frac{10000}{3+7} = \frac{10000}{10} = 1000\text{F} \\ \text{First} &= 3 \times 1000 = 3,000\text{F} \\ \text{Second} &= 7 \times 1000 = 7,000\text{F} \end{aligned} $								
10	$ \begin{aligned} &= 100\% - 20\% \\ &= 80\% \\ &= \frac{80}{100} \times 200\text{kg} \\ &= 160\text{kg} \end{aligned} $	11	$ \begin{aligned} P &= 2(L + W) \\ 40\text{cm} &= 2(12 + x) \\ 40\text{cm} &= 24\text{cm} + 2x \\ 2x &= 40\text{cm} - 24\text{cm} \\ 2x &= \frac{16\text{cm}}{2} \\ x &= 8\text{cm} \end{aligned} $	12	$ \begin{aligned} 2\text{kg} &= 620\text{Rwf} \\ 1\text{kg} &= (620 \div 2)\text{Rwf} \\ 8\text{kg} &= \left(\frac{620}{2} \times 8\right)\text{Rwf} \\ &= 2,480\text{Rwf} \end{aligned} $								
13	$ \begin{aligned} \text{Let that number be } x \\ &= 100\% + 20\% = 120\% \\ \frac{120}{100} \times x &= 2,400 \\ 120x &= 2,400 \times 100 \\ \frac{120x}{120} &= \frac{2,400 \times 100}{120} \\ x &= 2,000 \end{aligned} $	14	<table border="1"> <tbody> <tr> <td>4</td><td>7</td><td>6</td><td><u>x</u></td></tr> <tr> <td>9</td><td><u>y</u></td><td>13</td><td>21</td></tr> </tbody> </table> $ \begin{aligned} 2x + 1 &= y & 2x + 1 &= y \\ 2 \times 7 + 1 &= y & 2x + 1 &= 21 \\ 14 + 1 &= y & 2x &= 21 - 1 \\ 15 &= y & 2x &= \frac{20}{2} \\ & 2x &= 10 & \\ & x &= 5 & \end{aligned} $	4	7	6	<u>x</u>	9	<u>y</u>	13	21	15	$ \begin{aligned} V &= S \times S \times S \\ &= 5\text{cm} \times 5\text{cm} \times 5\text{cm} \\ &= 125\text{cm}^3 \\ D &= \frac{M}{V} \\ &= \frac{200\text{g}}{125\text{cm}^3} \\ &= 1.6\text{g/cm}^3 \end{aligned} $
4	7	6	<u>x</u>										
9	<u>y</u>	13	21										
16	<table border="1"> <tbody> <tr> <td>3</td><td>12</td><td>15</td><td>21</td></tr> <tr> <td></td><td>4</td><td>5</td><td>7</td></tr> </tbody> </table> <p>HCF = 3 (Only 3 can divide all the three given numbers at)</p>	3	12	15	21		4	5	7	17	$ \begin{aligned} x &= 10 \\ \text{Teacher's guidance} \end{aligned} $	18	$ \begin{aligned} P &= SP - CP \\ &= 3,900,000\text{Frw} - 3,000,000\text{Frw} \\ &= 900,000\text{Frw} \\ \%P &= \frac{P}{CP} \times 100 \\ &= \frac{900,000}{3,000,000} \times 100 \\ &= 30\% \end{aligned} $
3	12	15	21										
	4	5	7										
19	$ \begin{aligned} &= \frac{5}{4} \times \frac{16}{15} \\ &= \frac{4}{3} \\ &= 1\frac{1}{3} \end{aligned} $	20	$ \begin{aligned} C &= 2\pi r \\ &= 2 \times 3.14 \times 5\text{cm} \\ &= 31.4\text{cm} \end{aligned} $	21	$ \begin{aligned} &= a \times b + 2 \times a \times c \\ &= 1 \times 2 + 2 \times 1 \times 3 \\ &= 2 + 6 \\ &= 6 - 2 \\ &= 4 \end{aligned} $								
22	<p>A square has 4 lines of symmetry.</p> 	23	$ \begin{array}{r} 1\text{h} = 60\text{min} \\ 2\text{h} \\ - 1\text{h} \\ \hline 0\text{h} \end{array} \begin{array}{r} \text{Minutes} \\ 60 + 12 = 72 \\ 72 - 50 = 22 \\ \text{Hours} \\ 2 - 1 = 1 \\ 1 - 1 = 0 \end{array} \begin{array}{r} 7\text{ 2min} \\ 1\text{ 2min} \\ - 5\text{ 0min} \\ \hline 2\text{ 2min} \end{array} $	24	$ \begin{aligned} &= \frac{2 \text{ litres}}{500\text{ml}} \\ &= \frac{(2 \times 1,000)\text{ml}}{500 \text{ ml}} \\ &= 4 \text{ bottles} \end{aligned} $								
25	$ \begin{aligned} D &= Li \times Ni \\ 4,500 &= 50(Np - 1) \\ 4,500 &= 50Np - 50 \\ 4,500 + 50 &= 50Np \\ 4,550 &= 50Np \\ \frac{4,550}{50} &= \frac{50}{Np} \\ Np &= 91 \end{aligned} $	26	$ \begin{aligned} 1^{\text{st}} \text{ no} &= (x + 1) & 1^{\text{st}} &= 10 + 1 = 11 \\ 2^{\text{nd}} \text{ no} &= (x + 3) & 2^{\text{nd}} &= 10 + 3 = 13 \\ 3^{\text{rd}} \text{ no} &= (x + 5) & 3^{\text{rd}} &= 10 + 5 = 15 \\ 3x + 9 &= 39 \\ 3x &= 39 - 9 \\ \frac{3x}{3} &= \frac{30}{3} \\ x &= 10 \end{aligned} $	27	$ \begin{aligned} 111_{\text{two}} &= (1 \times 2 \times 2) + (1 \times 2) + (1 \times 1) \\ &= 4 + 2 + 1 \\ &= 7_{\text{ten}} \\ 102_{\text{three}} &= (1 \times 3 \times 3) + (0 \times 3) + (2 \times 1) \\ &= 9 + 2 \\ &= 11_{\text{ten}} \\ 111_{\text{two}} + 102_{\text{three}} &= 7_{\text{ten}} + 11_{\text{ten}} = 18_{\text{ten}} \end{aligned} $								

28	$6 \text{ men} = 4 \text{ days}$ $1 \text{ man} = (4 \times 6) \text{ days}$ $8 \text{ men} = \left(\frac{4 \times 6}{8}\right) \text{ days}$ $8 \text{ men} = 3 \text{ days}$	29 LCD = 56 $\frac{3}{7} = \frac{3}{7} \times 56 = 24 \dots \dots \text{(ii)}$ $\frac{5}{14} = \frac{5}{14} \times 56 = 20 \dots \dots \text{(i)}$ $\frac{13}{28} = \frac{13}{28} \times 56 = 26 \dots \dots \text{(iii)}$ $= \frac{5}{14}, \frac{3}{7}, \frac{13}{28}$	30 																													
31	<u>Part (a)</u> LCD = 12 (Multiply terms by LCD) $12\left(\frac{2x}{4}\right) - 12\left(\frac{x+1}{3}\right) = 12(2)$ $3(2x) - 4(x+1) = 24$ $6x - 4x - 4 = 24$ $2x = 24 + 4$ $\frac{2x}{2} = \frac{28}{2}$ $x = 14$ <u>Part (b)</u> $3x + 40^\circ - 10^\circ = 180^\circ$ $3x + 30^\circ = 180^\circ$ $3x = 180^\circ - 30^\circ$ $\frac{3x}{3} = \frac{150^\circ}{3}$ $x = 50^\circ$ $x + 40^\circ = 50^\circ + 40^\circ = 90^\circ$ $x - 10^\circ = 50^\circ - 10^\circ = 40^\circ$	<u>Part (a)</u> $P = \frac{I \times 100}{T \times R}$ $= \frac{20,000 \times 100}{2 \times 10}$ $= 100,000 \text{ Frw}$ <u>Part (b)</u> <table border="1"> <thead> <tr> <th></th> <th>1st</th> <th></th> <th>2nd</th> <th></th> <th>Mix</th> </tr> </thead> <tbody> <tr> <td>Qty</td> <td>8</td> <td>+</td> <td>12</td> <td>=</td> <td>20</td> </tr> <tr> <td>Px/kg</td> <td>250</td> <td></td> <td>x</td> <td></td> <td>280</td> </tr> </tbody> </table> $(250 \times 8) + (12 \times x) = (280 \times 20)$ $2,000F + 12x = 5,600F$ $12x = 5,600F - 2,000F$ $12x = 3,600F$ $\frac{12x}{12} = \frac{3,600F}{12}$ $x = 300F$ <p style="text-align: center;">The cost of the second type is 300F/kg</p>		1 st		2 nd		Mix	Qty	8	+	12	=	20	Px/kg	250		x		280	<u>Part (a)</u>  Time taken by each to meet another $T = \frac{D}{S_1 + S_2}$ $= \frac{300 \text{ km}}{90 \text{ km/h} + 60 \text{ km/h}}$ $= \frac{300 \text{ km}}{150 \text{ km/hr}}$ $= 2 \text{ hr}$ $D = S \times T \text{ (Car's information)}$ $= (90 \times 2) \text{ km}$ $= 180 \text{ km}$ <u>Part (b)</u> $T = 8:00 \text{ am} + 2 \text{ hr}$ $= 10:00 \text{ am}$											
	1 st		2 nd		Mix																											
Qty	8	+	12	=	20																											
Px/kg	250		x		280																											
34	Part (a) and part (b) Teacher's guidance <u>Part (c)</u> <table border="1"> <tr> <td>0</td> <td>1</td> <td>3</td> <td>x</td> </tr> <tr> <td>0</td> <td>2</td> <td>6</td> <td>3</td> </tr> </table> $2x = y$ $2x = 3$ $\frac{2x}{2} = \frac{3}{2}$ $x = 1.5$	0	1	3	x	0	2	6	3	35 Frequency table <table border="1"> <thead> <tr> <th>Ages (x)</th> <th>Frequency (f)</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>33</td> <td>4</td> <td>132</td> </tr> <tr> <td>35</td> <td>2</td> <td>70</td> </tr> <tr> <td>36</td> <td>1</td> <td>36</td> </tr> <tr> <td>40</td> <td>2</td> <td>80</td> </tr> <tr> <td>42</td> <td>1</td> <td>42</td> </tr> <tr> <td></td> <td>Total (f) = 10</td> <td>Total (fx) = 360</td> </tr> </tbody> </table> $\text{Mean} = \frac{\text{Total (f)}}{\text{Total (fx)}} = \frac{360}{10} = 36$	Ages (x)	Frequency (f)	fx	33	4	132	35	2	70	36	1	36	40	2	80	42	1	42		Total (f) = 10	Total (fx) = 360	
0	1	3	x																													
0	2	6	3																													
Ages (x)	Frequency (f)	fx																														
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	Total (f) = 10	Total (fx) = 360																														

WORKING & ANSWERS FOR PLE 2012

1	$ \begin{array}{ccccc} 4 & 7 & 10 & 13 & 16 \\ & \swarrow & \searrow & \swarrow & \searrow \\ (4+3)(7+3)(10+3)(13+3) \end{array} $	2	$ \begin{aligned} &= 340 \times \frac{4}{170} \times 4 \\ &= 32 \end{aligned} $	3	$ \begin{aligned} 4s &= 20\text{cm} \\ \frac{4s}{4} &= \frac{20}{4} \\ s &= 5\text{cm} \end{aligned} $	$ \begin{aligned} A &= S \times S \\ &= 5\text{cm} \times 5\text{cm} \\ &= 25\text{cm}^2 \end{aligned} $
4	$ \begin{aligned} \text{LCD} &= 12 \\ &= \frac{(\frac{1}{3} \times 12) + (\frac{1}{4} \times 12) + (\frac{5}{12} \times 12)}{12} \\ &= \frac{4+3+5}{12} \\ &= \frac{12}{12} = 1 \end{aligned} $	5	$ \begin{aligned} \text{Each} &= \frac{7000}{2+5} = \frac{7000}{10} = 1000\text{F} \\ \text{First} &= 2 \times 1000 = 2,000\text{F} \\ \text{Second} &= 5 \times 1000 = 5,000\text{F} \end{aligned} $	6	$ \begin{array}{cc} 2 & 140 \\ 2 & 70 \\ 5 & 35 \\ 7 & 7 \\ \hline & 1 \end{array} $	$ 140 = 2 \times 2 \times 5 \times 7 $
7	$ \begin{aligned} \text{LCD} &= 105 \\ \frac{2}{5} &= \frac{2}{5} \times 105 = 42 \dots \dots \text{(ii)} \\ \frac{1}{3} &= \frac{1}{3} \times 105 = 35 \dots \dots \text{(i)} \\ \frac{3}{7} &= \frac{3}{7} \times 105 = 45 \dots \dots \text{(iii)} \\ \text{Asc. Order} &= \frac{1}{3}, \frac{2}{5}, \frac{3}{7} \end{aligned} $	8	 $ \begin{aligned} A &= b \times h \\ &= 10\text{cm} \times 4\text{cm} \\ &= 40\text{ cm}^2 \end{aligned} $	9	$ \begin{aligned} &= 100\% + 2\% \\ &= 102\% \\ &= \frac{102}{100} \times 990\text{Frw} \\ &= 1,009.8\text{Frw} \end{aligned} $	
10	$ \begin{aligned} 2x + 4 &= 8 - 2x \\ 2x + 2x &= 8 - 4 \\ 4x &= 4 \\ \frac{4x}{4} &= \frac{4}{4} \\ x &= 1 \end{aligned} $	11	$ \begin{aligned} P &= 2(L + W) \\ 36 &= 2(L + 6) \\ 36 &= 2L + 12 \\ 36 - 12 &= 2L \\ 24 &= 2L \\ \frac{24}{2} &= \frac{2L}{2} \\ L &= 12\text{cm} \quad A = L \times W \\ &= 12\text{cm} \times 6\text{cm} \\ &= 72\text{cm}^2 \end{aligned} $	12	$ \begin{array}{cc c} B & N & R \\ \hline 2 & 5 & 1 \\ 2 & 2 & 0 \\ 2 & 1 & 1 \\ \hline 0 & & \end{array} $	$ \begin{aligned} &1011\text{two} \\ &+ 101\text{two} \\ \hline &10000\text{two} \end{aligned} $
13	$ \begin{aligned} \text{(a). } A \cup B &= \{2, 3, 4, 5, 7, 10, 11\} \\ \text{(b). } A \cap B &= \{2, 5\} \end{aligned} $	14	$ \begin{aligned} 3x + 4x + 2x &= 360^\circ \\ 9x &= 360^\circ \\ \frac{9x}{9} &= \frac{360^\circ}{9} \\ x &= 40^\circ \end{aligned} $	15	$ \begin{aligned} D &= 0.14\text{dm}, \\ r &= \frac{D}{2} = \frac{0.14\text{dm}}{2} = 0.07\text{dm} \\ A &= \frac{1}{2} \pi r^2 \\ &= \frac{1}{2} \times \frac{22}{7} \times \frac{7}{100} \text{dm} \times \frac{7}{100} \text{dm} \\ &= \frac{77}{10,000} \text{dm}^2 = 0.0077\text{dm}^2 \end{aligned} $	
16	$ \begin{aligned} S &= 60\text{km/hr} \\ T &= 9:00\text{am} - 8:05\text{am} \\ &= 55\text{min} = \frac{55}{60}\text{hr} \\ D &= S \times T \\ &= \frac{60\text{km}}{\text{hr}} \times \frac{55}{60}\text{hr} = 60\text{km} \end{aligned} $	17	$ \begin{aligned} \text{Angle } n &= 150^\circ \\ \text{Angle } m &= 180^\circ - 150^\circ \\ &= 30^\circ \end{aligned} $	18	$ \begin{aligned} \text{(a). } (60^\circ \text{ and } 30^\circ), (50^\circ \text{ and } 40^\circ), (20^\circ \text{ and } 70^\circ), (45^\circ \text{ and } 45^\circ), \text{ etc} \\ \text{(b). } (150^\circ \text{ and } 30^\circ), (100^\circ \text{ and } 80^\circ), (90^\circ \text{ and } 90^\circ), (120^\circ \text{ and } 60^\circ), \text{ etc} \end{aligned} $	
19	$ \begin{aligned} 3 \text{ people} &= 12\text{days} \\ 1 \text{ person} &= (12 \times 3)\text{days} \\ 9 \text{ people} &= \left(\frac{12 \times 3}{9}\right)\text{days} \\ &= 4\text{days} \end{aligned} $	20	$ \begin{aligned} h &= \sqrt{H^2 - b^2} \\ &= \sqrt{(10 \times 10) - (8 \times 8)} \\ &= \sqrt{100 - 64} \\ &= \sqrt{36\text{ cm}^2} \\ &= 6\text{cm} \end{aligned} $	21	$ \begin{aligned} x + 50^\circ &= 140^\circ \\ x &= 140^\circ - 50^\circ \\ x &= 90^\circ \end{aligned} $	
22	$ \text{Teacher's guidance} $	23	$ \begin{aligned} &= 100\% - 20\% \\ &= 80\% \\ \frac{80}{100} \times CP &= SP \\ 80CP &= 8,000 \times 100 \\ \frac{80CP}{80} &= \frac{8,000 \times 100}{80} = 10,000\text{Frw} \end{aligned} $	24	$ \begin{aligned} \text{(a). A Rhombus has 2 lines of symmetry} \\ \text{(b). An isosceles triangle has 1 line of folding symmetry} \end{aligned} $	
25	$ \begin{aligned} 5,000\text{Frw} &= 1\text{book} \\ 1\text{Frw} &= \frac{1}{5,000} \text{book} \\ 24,000\text{Frw} &= \frac{1}{5,000} \times 24,000 \\ &= 4\text{bks and bal of } 4,000\text{Frw} \end{aligned} $	26	$ \begin{aligned} &= 2x^2 + xy - x \\ &= 2 \times x \times x + x \times y - x \\ &= 2 \times 2 \times 2 + 2 \times 3 - 2 \\ &= 8 + 6 + 2 \\ &= 8 + 2 - 6 \\ &= 10 - 6 \\ &= 4 \end{aligned} $	27	$ \begin{aligned} D &= \frac{C}{\pi} \quad V = \pi r^2 h \\ &= \frac{31.4}{3.14} = \frac{314}{100} \times 5 \times 5 \times 10 \\ D &= 10\text{cm} \quad &= 785\text{cm}^3 \\ r &= 5\text{cm} \end{aligned} $	

28	$\begin{aligned}Ext &= 180^\circ - \text{int angle} \\&= 180^\circ - 150^\circ \\&= 30^\circ \\S &= \frac{360^\circ}{\text{ext angle}} \\&= \frac{360^\circ}{30^\circ} \\&= 12 \text{ sides}\end{aligned}$	29 $\begin{aligned}\text{Fees} &= \frac{1}{8}, \text{Car loan} = \frac{2}{5} \\Fr. rem &= 1 - (\text{fees} + \text{loan}) \\&= 1 - \left(\frac{1}{8} + \frac{2}{5}\right) LCD = 40 \\&= 1 - \left(\frac{4 + 16}{40}\right) = 1 - \frac{1}{2} = \frac{1}{2} \\Fr. rem \times \text{salary} &= \text{mny rem} \\&= \frac{1}{2} \times \text{salary} = 380,000 \text{ Frw} \\&= \text{Salary} = 380,000 \text{ Frw} \times 2 \\&= \text{Salary} = 760,000 \text{ Frw}\end{aligned}$	30 $\begin{aligned}\text{Let the total number be } x \\ \frac{45}{360} \times x = 40 \\ x = \frac{40 \times 360}{45} \\ x = 320 \text{ animals} \\ \text{Goats} &= 320 - (\text{pigs} + \text{cows}) \\&= 320 - (40 + 120) \\&= 320 - 160 \\&= 160 \text{ goats}\end{aligned}$																					
31	<p><u>Part (a)</u></p> $\begin{aligned}T &= \frac{D}{S_1 + S_2} \\&= \frac{50 \text{ km}}{45 \text{ km/hr} + 30 \text{ km/hr}} \\&= \frac{50 \text{ km}}{75 \text{ km/hr}} = \frac{2}{3} \text{ hr} \\D &= S \times T \text{ (Car's information)} \\&= \left(45 \times \frac{2}{3}\right) \text{ km} \\&= 30 \text{ km}\end{aligned}$ <p><u>Part (b)</u></p> $\begin{aligned}T &= \text{start time} + \text{duration} \\&= 7:30 \text{ am} + \left(\frac{2}{3} \times 60\right) \text{ min} \\&= 7:30 \text{ am} + 40 \text{ min} \\&= 8:10 \text{ am}\end{aligned}$	32 $\begin{aligned}\text{(a). } 642 \times 50 &= (642 \times 100) \div 2 \\&= 64,200 \div 2 \\&= 32,100\end{aligned}$ $\begin{aligned}\text{(b). } 2,224 \times 49 &= \left(\frac{2,224 \times 100}{2}\right) - 2,224 \\&= \left(\frac{222,400}{2}\right) - 2,224 \\&= 111,200 - 2,224 \\&= 108,976\end{aligned}$ $\begin{aligned}\text{(c). } 16,999 \times 99 &= (16,999 \times 100) - 16,999 \\&= 169,990 - 16,999 \\&= 1,682,901\end{aligned}$ $\begin{aligned}\text{(d). } 4,444 \times 25 &= (4,444 \times 100) \div 4 \\&= 444,400 \div 4 \\&= 111,100\end{aligned}$	33 <table border="1"> <thead> <tr> <th>x</th><th>f</th><th>fx</th></tr> </thead> <tbody> <tr> <td>0</td><td>3</td><td>0</td></tr> <tr> <td>1</td><td>2</td><td>2</td></tr> <tr> <td>2</td><td>2</td><td>4</td></tr> <tr> <td>3</td><td>3</td><td>9</td></tr> <tr> <td>4</td><td>0</td><td>0</td></tr> <tr> <td>Total</td><td>Tf = 10</td><td>Tfx = 15</td></tr> </tbody> </table> $\text{Mean goals} = \frac{Tfx}{Tf} = \frac{15}{10} = 1.5$ <p>Approximately <u>2</u> goals per match.</p>	x	f	fx	0	3	0	1	2	2	2	2	4	3	3	9	4	0	0	Total	Tf = 10	Tfx = 15
x	f	fx																						
0	3	0																						
1	2	2																						
2	2	4																						
3	3	9																						
4	0	0																						
Total	Tf = 10	Tfx = 15																						
34	<p><u>First year</u></p> $I = \frac{PTR}{100} = \frac{90000 \times 1 \times 10}{100} = 9,000 \text{ F}$ $A = 90,000 + 9,000 = 99,000 \text{ F}$ <p><u>Second year</u></p> $I = \frac{PTR}{100} = \frac{99000 \times 1 \times 10}{100} = 9,900 \text{ F}$	35 <table border="1"> <thead> <tr> <th></th><th>Type A</th><th>+</th><th>Type B</th><th>=</th><th>Mixture</th></tr> </thead> <tbody> <tr> <td>Qty</td><td>300</td><td>+</td><td>x</td><td>=</td><td>(300 + x)</td></tr> <tr> <td>Px/kg</td><td>300</td><td></td><td>400</td><td></td><td>340</td></tr> </tbody> </table> <p><u>Multiply each quantity by its price to form an equation</u></p> $(300 \times 300) + (400 \times x) = 340(300 + x)$ $90,000 + 400x = 102,000 + 340x$ $400x - 340x = 102,000 - 90,000$ $60x = 12,000$ $\frac{60x}{60} = \frac{12,000}{60}$ $x = 200 \text{ F}$ <p><i>The quantity of the second type costs 200F per kg.</i></p>		Type A	+	Type B	=	Mixture	Qty	300	+	x	=	(300 + x)	Px/kg	300		400		340				
	Type A	+	Type B	=	Mixture																			
Qty	300	+	x	=	(300 + x)																			
Px/kg	300		400		340																			

WORKING & ANSWERS FOR PLE 2011

1	$= \frac{4 \times 12 \times 21}{3 \times 18 \times 14} = \frac{4}{3} = 1\frac{1}{3}$	2	$\begin{array}{r} 0.451 \\ + 1.002 \\ \hline 1.453 \end{array}$	3	$\begin{array}{r} 1h = 60\text{min} \\ 1h \quad 84\text{min} \\ 2h \quad 24\text{min} \\ - 1h \quad 56\text{min} \\ \hline 0h \quad 28\text{min} \end{array}$ <p>Minutes 60 + 24 = 84 84 - 56 = 28 Hours 2 - 1 = 1 1 - 1 = 0</p>
4	$\begin{array}{ccccccccc} 2 & 6 & 18 & 54 & 162 & 486 \\ \times 3 & \end{array}$	5	$\begin{aligned} \frac{3}{7} \times 21 &= (21 \div 7) \times 3 \\ &= 3 \times 3 \\ &= 9 \end{aligned}$	6	$\begin{aligned} \text{LCD after reducing} &= 28 \\ \frac{9}{12} &= \frac{3}{4} \times 28 = 21 \dots \dots (iii) \\ \frac{14}{49} &= \frac{2}{7} \times 28 = 8 \dots \dots (ii) \\ \frac{21}{147} &= \frac{1}{7} \times 28 = 4 \dots \dots (i) \\ \text{Smallest fraction} &= \frac{21}{147} \end{aligned}$
7	$\begin{aligned} 4s &= 44\text{cm} & A &= S \times S \\ \frac{4s}{4} &= \frac{44}{4} & &= 11\text{cm} \times 11\text{cm} \\ s &= 11\text{cm} & &= 121\text{cm}^2 \end{aligned}$	8	$\begin{aligned} &= 50 - \left(\frac{30}{100} \times 50 \right) \text{litres} \\ &= 50\text{litres} - 15\text{litres} \\ &= 35\text{litres} \end{aligned}$	9	$\begin{aligned} &= (6 \div 3)x^{2-1}y^{4-2} \\ &= 2xy^2 \end{aligned}$
10	$\begin{aligned} &= ab + 3c \\ &= a \times b + 3 \times c \\ &= 2 \times 1 + 3 \times 3 \\ &= 2 + 9 \\ &= 9 - 2 \\ &= 7 \end{aligned}$	11	$\begin{aligned} &= \frac{5}{3} \times 18,000\text{Frw} \\ &= 30,000\text{Frw} \end{aligned}$	12	$\begin{aligned} P &= S \times 8 \\ &= 6\text{cm} \times 8 \\ &= 48\text{cm} \end{aligned}$
13	$\begin{array}{r} 2,000,000 \\ 450,000 \\ + \quad 5 \\ \hline 2,450,005 \end{array}$	14	$\begin{aligned} 3\text{men} &= 4\text{kg} \\ 1\text{man} &= \frac{4}{3}\text{kg} \\ 12\text{men} &= \left(\frac{4}{3} \times 12 \right) \text{kg} \\ &= 16\text{kg} \end{aligned}$	15	$\begin{aligned} I &= \frac{P \times T \times R}{100} \\ &= \frac{3,000,000 \times 2 \times 10}{100} \\ &= 600,000\text{Frw} \end{aligned}$
16	<i>Teacher's guidance</i>	17	$\begin{aligned} A &= \frac{b \times h}{2} \\ &= \frac{4\text{cm} \times 7\text{cm}}{2} \\ &= 14\text{cm}^2 \end{aligned}$	18	$\begin{aligned} P &= C + D \\ &= \frac{1}{2}\pi D + D \\ &= \frac{1}{2} \times \frac{22}{7} \times 70\text{cm} + 70\text{cm} \\ &= 110\text{cm} + 70\text{cm} \\ &= 180\text{cm} \end{aligned}$
19	$= \left(\frac{25 - 3}{2} \right) = \frac{22}{2} = 11\text{years}$	20	$\begin{aligned} 200F &= 1\text{bk} \\ 1F &= \frac{1}{200}\text{bk} \\ 2,100F &= \frac{1}{200} \times 2,100 \\ &= 10\text{books and bal of } 100F \end{aligned}$	21	$\begin{aligned} V &= S \times S \times S \\ &= 6.3\text{cm} \times 6.3\text{cm} \times 6.3\text{cm} \\ &= 250.047\text{cm}^3 \end{aligned}$
22	$\begin{aligned} 550F &= 1\text{dollar} \\ 1F &= \frac{1}{550}\text{dollar} \\ 11,000,000F &= \frac{1}{550} \times 11,000,000 \\ &= 20,000\text{dollars} \end{aligned}$	23	$\begin{aligned} \text{Difference is in the } &\text{last two digits.} \\ &= (80 - 61) + 1 \\ &= 19 + 1 \\ &= 20\text{notes} \end{aligned}$	24	$\begin{aligned} V &= S \times S \times S \\ &= 6.3\text{cm} \times 6.3\text{cm} \times 6.3\text{cm} \\ &= 250.047\text{cm}^3 \end{aligned}$
25	$\begin{aligned} &= \frac{\sqrt{27} \times \sqrt{75}}{5} \\ &= \frac{\sqrt{2025}}{5} \\ &= \frac{45}{5} \\ &= 9 \end{aligned}$	26	$\begin{aligned} &= 100\% + 10\% + 5\% \\ &= 115\% \\ &= \frac{115}{100} \times 110,000\text{Frw} \\ &= 126,500\text{Frw} \end{aligned}$	27	$\begin{array}{ll} \text{1st year} & \text{2nd year} \\ = \frac{P \times T \times R}{100} & = \frac{P \times T \times R}{100} \\ = \frac{300,000 \times 1 \times 5}{100} & = \frac{315,000 \times 1 \times 5}{100} \\ = 15,000\text{Frw} & = 15,750\text{Frw} \\ = 300,000 + 15,000 & = 300,000 + 15,750 \\ = 315,000\text{Frw} & = 330,750\text{Frw} \end{array}$
28	$\begin{aligned} TSA &= 2LW + 2LH + 2WH \\ &= 2(19 \times 12 + 19 \times 7 + 12 \times 7) \text{cm}^2 \\ &= 2(228 + 133 + 84) \text{cm}^2 \\ &= 2 \times 445\text{cm}^2 \end{aligned}$	29	$\begin{array}{ c c c c c } \hline & B & + & M & = & \text{Mix} \\ \hline 10 & & + & 20 & = & 30 \\ \hline x & & 140 & & 160 & \\ \hline \end{array}$ $(10 \times x) + (140 \times 20) = (160 \times 30)$	30	$\begin{aligned} 6\text{men} &= 2\text{days} \\ 1\text{man} &= (2 \times 6)\text{days} \\ 4\text{men} &= \left(\frac{2 \times 6}{4} \right) \text{days} \\ &= 3\text{days} \end{aligned}$

31	<p><u>Part (a)</u></p> <p>LCD = 10</p> $10\left(\frac{4x-2}{5}\right) = 10\left(\frac{x}{2}\right) + 10(2)$ $2(4x-2) = 5(x) + 10(2)$ $8x - 4 = 5x + 20$ $8x - 5x = 20 + 4$ $3x = 24$ $\frac{3x}{3} = \frac{24}{3}$ $x = 8$ <p><u>Part (b)</u></p> $= 3m - 6n - 2m + 8n$ $= 3m - 2m + 8n - 6n$ $= m + 2n$	32	$= \frac{\left(\frac{4}{15} \times \frac{45}{8}\right) + \left(\frac{5}{7} \times \frac{14}{15}\right)}{\frac{26}{9}}$ $= \frac{\frac{3}{2} + \frac{2}{3}}{\frac{26}{9}} = \left(\frac{3}{2} + \frac{2}{3}\right) \div \frac{26}{9}$ $= \left(\frac{\frac{3}{2} \times 6 + \frac{2}{3} \times 6}{6}\right) \div \frac{26}{9}$ $= \left(\frac{9 + 4}{6}\right) \div \frac{26}{9}$ $= \frac{13}{6} \div \frac{26}{9} = \frac{13}{6} \times \frac{9}{26} = \frac{3}{4}$																											
33			<table border="1"> <thead> <tr> <th>x</th> <th>f</th> <th>fx</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>2</td> <td>10</td> </tr> <tr> <td>7</td> <td>2</td> <td>14</td> </tr> <tr> <td>9</td> <td>2</td> <td>18</td> </tr> <tr> <td>10</td> <td>4</td> <td>40</td> </tr> <tr> <td>11</td> <td>2</td> <td>22</td> </tr> <tr> <td>12</td> <td>2</td> <td>24</td> </tr> <tr> <td>13</td> <td>4</td> <td>52</td> </tr> <tr> <td>Total</td> <td>Tf = 18</td> <td>Tfx = 180</td> </tr> </tbody> </table> <p>Tfx = 180</p> <p>Mean = $\frac{Tfx}{Tf} = \frac{180}{18} = 10$</p>	x	f	fx	5	2	10	7	2	14	9	2	18	10	4	40	11	2	22	12	2	24	13	4	52	Total	Tf = 18	Tfx = 180
x	f	fx																												
5	2	10																												
7	2	14																												
9	2	18																												
10	4	40																												
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12	2	24																												
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Total	Tf = 18	Tfx = 180																												
34	<p><u>Part (a)</u></p> $\begin{array}{r} 1011 \text{two} \\ + 110 \text{two} \\ \hline 10001 \text{two} \end{array}$ <p><u>Part (b)</u></p> <table border="1"> <thead> <tr> <th>B</th> <th>N</th> <th>R</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>72</td> <td>0</td> </tr> <tr> <td>3</td> <td>24</td> <td>0</td> </tr> <tr> <td>3</td> <td>8</td> <td>2</td> </tr> <tr> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td>0</td> <td></td> </tr> </tbody> </table> <p>72ten = 2200three</p>	B	N	R	3	72	0	3	24	0	3	8	2	3	2	2		0		35	<p><u>Part (a)</u></p> <p>Set B = {s, u, r, f, a, c, e}</p> <p><u>Part (b)</u></p> <p>$A \cap B = \{f, a, c, e\}$</p> <p><u>Part (c)</u></p> <p>$A \cup B = \{a, b, c, d, e, f, s, u, r\}$</p>									
B	N	R																												
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36			$h = \sqrt{H^2 - b^2}$ $= \sqrt{(5 \times 5)cm^2 - (4 \times 4)cm^2}$ $= \sqrt{25cm^2 - 16cm^2}$ $= \sqrt{9cm^2}$ $= 3cm$ $P = AB + BC + CD + DA$ $24cm = x + 5 + 4 + x + 3$ $24cm = 2x + 12$ $24cm - 12cm = 2x$ $\frac{12cm}{2} = \frac{2x}{2}$ $x = 6cm$ $AB = 6cm, CD = 6 + 4 = 10cm$ $A = \frac{h}{2}(a + b)$ $= \frac{3}{2}(6cm + 10cm)$ $= \frac{3cm \times 16cm}{2} = 24cm^2$																											
37	$T = \frac{D}{S_1 + S_2}$ $= \frac{170km}{56km/h + 80km/h}$ $= \frac{170km}{136km/hr} = \frac{5}{4} \text{ hr}$	<p>Distance</p> $D = S \times T$ $D = 56 \times \frac{5}{4} = 70\text{km}$	<p>Part b</p> $T = 9:00\text{am} + \frac{5}{4} \text{ hr}$ $= 9:00\text{am} + 1 : 15 = 10:15\text{am}$																											

WORKING & ANSWERS FOR PLE 2010

1	<p>Hint: Distributive property $= 55(112 - 12)$ $= 55 \times 100$ $= 5,500$</p>	2	Hundreds	3	<p>Hint: A number line is arranged in ascending order from left to right.</p> <p>$-8 \quad -1 \quad 0 \quad 11 \quad 17$ $= -8, -1, 0, 11, 17$</p>												
4	$ \begin{array}{r} = \frac{31}{1000} \times \frac{11}{10} \\ = \frac{341}{10,000} \\ = 0.0341 \end{array} \quad \begin{array}{r} 0.0341 \\ + 0 \\ \hline 0.03 \end{array} $	5	$ \begin{aligned} &= \left(\frac{4}{10} \times 1000 \right) \text{cm}^3 \\ &= 400 \text{cm}^3 \end{aligned} $	6	<p><u>2, 8, 14, 20, 26</u></p> <p>$2 \quad 8 \quad 14 \quad 20 \quad 26$ $= 2, 8, 14, 20, 26$</p>												
7	$ \begin{aligned} 4 \text{ litres} &= 60 \text{ km} \\ 1 \text{ litre} &= (60 \text{ km} \div 4 \text{ km}) \\ 16 \text{ litres} &= \left(\frac{60 \times 16}{4} \right) \text{ km} \\ 16 \text{ litres} &= 240 \text{ km} \end{aligned} $	8	$ \begin{array}{cccc} 2 & 15 & 24 & 40 \\ 2 & 15 & 12 & 20 \\ 2 & 15 & 6 & 10 \\ 3 & 15 & 3 & 5 \\ 5 & 5 & 1 & 5 \\ 1 & & 1 & \end{array} $ <p>$= 2 \times 2 \times 2 \times 3 \times 5$ $= 120$</p>	9	<table border="1"> <tr><td>2</td><td>48</td></tr> <tr><td>2</td><td>24</td></tr> <tr><td>2</td><td>12</td></tr> <tr><td>2</td><td>6</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td></td><td>1</td></tr> </table> <p>$48 = 2 \times 2 \times 2 \times 2 \times 3$ or $48 = 2^4 \times 3^1$</p>	2	48	2	24	2	12	2	6	3	3		1
2	48																
2	24																
2	12																
2	6																
3	3																
	1																
10	$ \begin{aligned} 4(x + 1) &= 2x + 7 \\ 4x + 4 &= 2x + 7 \\ 4x - 2x &= 7 - 4 \\ 2x &= 3 \\ 2x &= 3 \\ \frac{2}{2} &= \frac{2}{2} \\ x &= 1.5 \end{aligned} $	11	$ \begin{aligned} &= 100\% + 9\% \\ &= 109\% \\ &= \frac{109}{100} \times 240 \text{ kg} \\ &= 261.6 \text{ kg} \end{aligned} $	12	$ \begin{aligned} S^2 &= 625 \text{ cm}^2 \\ \sqrt{S^2} &= \sqrt{625 \text{ cm}^2} \\ S &= 25 \text{ cm} \\ P &= S \times 4 \\ &= 25 \text{ cm} \times 4 \\ &= 100 \text{ cm} \end{aligned} $												
13	<table border="1"> <tr><td>4</td><td>6</td><td>7</td><td>x</td></tr> <tr><td>9</td><td>13</td><td>y</td><td>25</td></tr> </table> $ \begin{aligned} 2x + 1 &= y & 2x + 1 &= y \\ 2 \times 7 + 1 &= y & 2x + 1 &= 25 \\ 14 + 1 &= y & 2x &= 25 - 1 \\ 15 &= y & x &= 24 : 2 \\ & & x &= 12 \end{aligned} $	4	6	7	x	9	13	y	25	14	$ \begin{aligned} &= \frac{3}{4} \times 2,000 \text{ Frw} \\ &= 1,500 \text{ Frw} \end{aligned} $	15	$ \begin{aligned} &= (4 \times 2)x^{(4+2)}y^{(3+2)} \\ &= 8x^6y^5 \end{aligned} $				
4	6	7	x														
9	13	y	25														
16	$ \begin{aligned} 1 \text{ cake} &= 1.25 \text{ kg} \\ 6 \text{ cakes} &= \left(\frac{125}{100} \times 6 \right) \text{ kg} \\ &= 7.5 \text{ kg of flour} \end{aligned} $	17	$ \begin{aligned} C &= \pi D \\ &= 3.14 \times 30 \text{ cm} \\ &= \frac{314 \times 30 \text{ cm}}{100} \\ &= 94.2 \text{ cm} \end{aligned} $	18	$ \begin{aligned} &= \frac{3}{25} \times 150 \text{ m} \\ &= 18 \text{ m} \end{aligned} $												
19	$ \begin{aligned} 10 \text{ men} &= 4 \text{ days} \\ 1 \text{ man} &= (4 \times 10) \text{ days} \\ 8 \text{ men} &= \left(\frac{4 \times 10}{8} \right) \text{ days} \\ &= 5 \text{ days} \end{aligned} $	20	$ \begin{aligned} x &= 180^\circ - (80^\circ + 30^\circ) \\ x &= 180^\circ - 110^\circ \\ x &= 70^\circ \end{aligned} $	21	$ \begin{aligned} I &= \frac{P \times T \times R}{1,200,000 \times 3 \times 8} \\ I &= \frac{100}{100} \\ I &= 288,000 \text{ Frw} \end{aligned} $												
22	$ \begin{aligned} 45 &= 40 + 5 \\ &= XL + V \\ &= XLV \end{aligned} $	23	$ \begin{aligned} A &= L \times W \\ &= 13 \text{ cm} \times 6 \text{ cm} \\ &= 78 \text{ cm}^2 \end{aligned} $	24	$ \begin{aligned} &= (45 \times 1000) \text{ g} + 65 \text{ g} + (1000 \div 1000) \text{ g} \\ &= 45,000 \text{ g} + 65 \text{ g} + 1 \text{ g} \\ &= 45,066 \text{ g} \end{aligned} $												
25	$ \begin{aligned} S^2 &= 64 \text{ cm}^2 \\ \sqrt{S^2} &= \sqrt{64 \text{ cm}^2} \\ S &= 8 \text{ cm} \\ V &= S^3 \\ &= 8 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm} \\ &= 512 \text{ cm}^3 \end{aligned} $	26	$ \begin{aligned} P &= SP - CP \\ &= 6,000 \text{ Frw} - 5,000 \text{ Frw} \\ &= 1,000 \text{ Frw} \\ \%P &= \frac{P}{CP} \times 100 \\ &= \frac{1,000}{5,000} \times 100 \\ &= 20\% \end{aligned} $	27	$ \begin{aligned} \frac{x + 12 + 8}{3} &= 9 \\ \frac{x + 20}{3} &= 9 \\ x + 20 &= (9 \times 3) \\ x &= 27 - 20 \\ x &= 7 \end{aligned} $												

28	<p>Hint: We can use proportions</p> $50\text{min} = 45\text{km}$ $1\text{min} = \left(\frac{45}{50}\right)\text{km}$ $(2\text{hr})120\text{min} = \left(\frac{45}{50} \times 120\right)\text{km}$ $= 108\text{km}$	29	$= (\sqrt{64} - \sqrt{25}) \div \sqrt{9}$ $= (8 - 5) \div 3$ $= 3 \div 3$ $= 1$
31	<p><u>1st year</u></p> $= \frac{P \times T \times R}{100}$ $= \frac{1,000,000 \times 1 \times 6}{100}$ $I = 60,000\text{Frw}$ $A = 1,000,000F + 60,000F$ $= 1,060,000\text{Frw}$ <p><u>2nd year</u></p> $= \frac{P \times T \times R}{100}$ $= \frac{1,060,000 \times 1 \times 6}{100}$ $I = 63,600\text{Frw}$ $A = 1,060,000F + 63,600F$ $= 1,123,600\text{Frw}$ <p><u>3rd year</u></p> $= \frac{P \times T \times R}{100}$ $= \frac{1,123,600 \times 1 \times 6}{100}$ $I = 67,416\text{Frw}$ $A = 1,123,600F + 67,416F$ $= 1,191,016\text{Frw}$	32	$h = \sqrt{H^2 - b^2}$ $= \sqrt{(10\text{cm} \times 10\text{cm}) - (6\text{cm} \times 6\text{cm})}$ $= \sqrt{100\text{cm}^2 - 36\text{cm}^2}$ $= \sqrt{64\text{cm}^2}$ $= 8\text{cm}$ $A = \frac{b \times h}{2}$ $= \frac{6\text{cm} \times 8\text{cm}}{2}$ $= 24\text{cm}^2$
33		34	<p><u>Part (a)</u></p> $\text{Height of prism} = \text{Length}(L)$ $\text{Vol} = 48\text{cm}^3$ $\frac{b \times h}{2} \times L = 48\text{cm}^3$ $\frac{4\text{cm} \times 3\text{cm} \times L}{2} = 48\text{cm}^3$ $6\text{cm}^2 \times L = 48\text{cm}^3$ $L = \frac{48\text{cm}^3}{6\text{cm}^2}$ $L = 8\text{cm}$ <p><u>Part (b)</u></p> $H = \sqrt{b^2 + h^2}$ $= \sqrt{(4 \times 4) + (3 \times 3)}$ $= \sqrt{16\text{cm}^2 + 9\text{cm}^2}$ $= \sqrt{25\text{cm}^2}$ $= 5\text{cm}$ $TSA = (b \times h) + L(b + h + H)$ $= (4 \times 3)\text{cm}^2 + 8(4 + 3 + 5)\text{cm}^2$ $= 12\text{cm}^2 + 8 \times 12\text{cm}^2$ $= 12\text{cm}^2 + 96\text{cm}^2$ $= 108\text{cm}^2$
35		36	36
			<u>Teacher's guidance</u>

WORKING & ANSWERS FOR PLE 2009

1	$ \begin{array}{r} 2 \ 4 \ 6 \\ 3 \ 0 \ 9 \quad 8 \ 0 \ 9 \\ + 2 \ 5 \ 4 \quad - 2 \ 0 \ 9 \\ \hline 8 \ 0 \ 9 \quad 6 \ 0 \ 0 \end{array} $	2	$ \begin{aligned} &= \frac{1}{5} \times 300g \\ &= 60g \end{aligned} $	3	$ \begin{array}{r} 0.008 \\ 5 \overline{)0.04} \\ \quad 0 \downarrow \\ \quad 00 \\ \quad -0 \\ \quad \underline{40} \\ \quad 40 \\ \hline \quad 00 \end{array} $																				
4	$ \begin{array}{l} 1h \ 60min \\ \text{Minutes} \\ 60 + 10 = 70 \\ 70 - 40 = 30 \\ \text{Hours} \\ 3 - 1 = 2 \\ 2 - 1 = 1 \\ \hline 2h \ 70min \\ -1h \quad 40min \\ \hline 1h \ 30min \\ = 60min + 30min \\ = 90min \end{array} $	5	<p>Hint: Integers on a number line are in ascending order from left to right.</p> <p>0 > -1 and -5 < -1 are true statements</p>	6	$ \begin{aligned} (a). Comp &= 90^\circ - 27^\circ \\ &= 63^\circ \\ \\ (b). Supp &= 180^\circ - 135^\circ \\ &= 45^\circ \end{aligned} $																				
7	$ \begin{aligned} \text{Chairs} &= \text{number of people} \\ 1 \text{ row} &= 14 \text{ chairs} \\ 43 \text{ rows} &= (14 \times 43) \text{ chairs} \\ &= 602 \text{ chairs} \end{aligned} $	8	$ \begin{aligned} &= -159 - (-467) \\ &= -159 - 467 \\ &= -159 + 467 \\ &= 467 - 159 \\ &= 308 \end{aligned} $	9	$ = \frac{\frac{5}{6} \times 24}{40} = \frac{20}{40} = \frac{1}{2} $																				
10	$ \begin{aligned} &= 2 + 3 + 5 + 7 + 11 + 13 \\ &= 41 \end{aligned} $	11	$ \begin{aligned} 3.2 \text{ km} &= \left(\frac{32}{10} \times 1000 \right) = 3200 \text{ m} \\ 67 \text{ dm} &= (67 \div 10) = 6.7 \text{ m} \\ 234 \text{ cm} &= (234 \div 100) = 2.34 \text{ m} \\ &= 3200 \text{ m} + 6.7 \text{ m} + 2.34 \text{ m} \\ &= 3209.04 \text{ m} \end{aligned} $	12	$ = \frac{11}{5} \times 800 \\ = 1,760 $																				
13	$ = \frac{7}{16} \times 100 \\ = 43.75\% $	14	$ \begin{aligned} &= x^{(3-1)} y^{(5-3)} \\ &= x^2 y^2 \end{aligned} $	15																					
16	$ \begin{aligned} \text{Scale} &= \frac{5 \text{ cm}}{1.5 \text{ km}} \\ &= \frac{5 \text{ cm}}{(1.5 \times 100,000) \text{ cm}} \\ &= \frac{5}{150,000} = \frac{1}{30,000} \end{aligned} $	17	$ \begin{aligned} C &= 2\pi r \\ &= 2 \times \frac{22}{7} \times 42 \text{ cm} \\ &= 264 \text{ cm} \end{aligned} $	18	$ \begin{aligned} 3x - 5x &= 13 - 7 \\ -2x &= 6 \\ -2x &= \frac{6}{-2} \\ x &= -3 \end{aligned} $																				
19	$ \begin{aligned} I &= P \times T \times \frac{R}{100} \\ 30,600 &= 170,000 \times \frac{9}{12} \times \frac{R}{100} \\ 30,600 \times 12 \times 100 &= R \\ \frac{170,000 \times 9}{170,000 \times 12} &= R \\ 24\% &= R \end{aligned} $	20	$ \begin{aligned} A &= \frac{b \times h}{2} \\ &= \frac{8 \text{ cm} \times 6 \text{ cm}}{2} \\ &= 24 \text{ cm}^2 \end{aligned} $	21	$ \begin{aligned} V &= \pi r^2 h \\ &= \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \times 10 \text{ cm} \\ &= 1,540 \text{ cm}^3 \end{aligned} $																				
22	$ \begin{aligned} LCD &= 21 \\ &= \frac{2}{7} \div \left(\frac{\left(\frac{2}{3} \times 21 \right) + \left(\frac{4}{7} \times 21 \right)}{21} \right) \\ &= \frac{2}{7} \div \left(\frac{14 + 12}{21} \right) \\ &= \frac{2}{7} \div \frac{26}{21} = \frac{2}{7} \times \frac{21}{26} = \frac{3}{13} \end{aligned} $	23	<table border="1"> <tbody> <tr> <td>2</td><td>4</td><td>6</td><td>10</td></tr> <tr> <td>2</td><td>2</td><td>3</td><td>5</td></tr> <tr> <td>3</td><td>1</td><td>3</td><td>5</td></tr> <tr> <td>5</td><td></td><td>1</td><td>5</td></tr> <tr> <td></td><td></td><td></td><td>1</td></tr> </tbody> </table> <p> $\begin{aligned} &= 2 \times 2 \times 3 \times 5 \\ &= 60 \text{ seconds} \\ &= (60 \div 60) \text{ minutes} \\ &= 1 \text{ minute} \end{aligned}$ </p> <p>They will all ring after 1</p>	2	4	6	10	2	2	3	5	3	1	3	5	5		1	5				1	24	<p>Area of square = Area of rectangle</p> $ \begin{aligned} S^2 &= L \times W \\ S^2 &= 16 \text{ cm} \times 9 \text{ cm} \\ S^2 &= 144 \text{ cm}^2 \\ \sqrt{S^2} &= \sqrt{144 \text{ cm}^2} \\ S &= 12 \text{ cm} \end{aligned} $
2	4	6	10																						
2	2	3	5																						
3	1	3	5																						
5		1	5																						
			1																						
25	$ \begin{aligned} \frac{x + 12 + 13 + 15}{4} &= 12.5 \\ \frac{x + 40}{4} &= 12.5 \\ x + 40 &= 12.5 \times 4 \\ x &= 50 - 40 \\ x &= 10 \end{aligned} $	26	$ \begin{aligned} &= 100\% - 10\% \\ &= 90\% \\ \frac{90}{100} \times CP &= 4320 \\ CP &= \frac{4320 \times 100}{90} \\ CP &= 4,800 \text{ Frw} \end{aligned} $	27	$ \begin{aligned} x + (x + 10) + 2x + 3x &= 180^\circ(n - 2) \\ 7x + 10 &= 180^\circ(4 - 2) \\ 7x + 10^\circ &= 180^\circ \times 2 \\ 7x &= 360^\circ - 10^\circ \\ \frac{7x}{7} &= \frac{350^\circ}{7} \\ x &= 50^\circ \\ (x + 10) &= 50 + 10 = 60^\circ \\ 2x &= 50 \times 2 = 100^\circ \\ 3x &= 50 \times 3 = 150^\circ \end{aligned} $																				

28	<p><u>1st year</u></p> $= \frac{P \times T \times R}{100}$ $= \frac{90,000 \times 1 \times 12}{100}$ $I = 10,800 \text{ Frw}$ $A = 90,000F + 10,800F$ $= 100,800 \text{ Frw}$ <p><u>2nd year</u></p> $= \frac{P \times T \times R}{100}$ $= \frac{100,800 \times 1 \times 12}{100}$ $I = 12,096 \text{ Frw}$ $A = 100,800F + 12,096F$ $= 112,896 \text{ Frw}$	29	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th>A</th><th>+</th><th>B</th><th>=</th><th>Mix</th></tr> </thead> <tbody> <tr> <td>Qty</td><td>100</td><td>+</td><td>80</td><td>=</td><td>180</td></tr> <tr> <td>Px/kg</td><td>200</td><td></td><td>245</td><td></td><td>x</td></tr> </tbody> </table> $(100 \times 200) + (80 \times 245) = (180 \times x)$ $20,000 + 19,600 = 180x$ $39,600 = 180x$ $\frac{39,600}{180} = \frac{180x}{180}$ $220 = x$ <p><i>Therefore the cost per kg of the mixture is 220F</i></p>		A	+	B	=	Mix	Qty	100	+	80	=	180	Px/kg	200		245		x
	A	+	B	=	Mix																
Qty	100	+	80	=	180																
Px/kg	200		245		x																
31	Teacher's guidance	32	<p><u>Part (a)</u></p> <p>Hint: We can use proportions</p> $8 \text{ cm}^3 = 12 \text{ g}$ $1 \text{ cm}^3 = \frac{12 \text{ g}}{8 \text{ cm}^3}$ $9 \text{ cm}^3 = \frac{(12 \text{ g} \times 9 \text{ cm}^3)}{8 \text{ cm}^3}$ $= 13.5 \text{ g}$ <p><u>Part (b)</u></p> $\begin{matrix} q & p \\ 6 & 4 \\ 1 & 4 \times 6 \\ 8 & \frac{4 \times 6}{8} = 3 \end{matrix}$																		
34	Teacher's guidance	35	<p><u>Numerator</u></p> $= \left(\frac{7}{2} \times \frac{5}{4} \right) + \left(\frac{5}{2} - \frac{7}{4} \right)$ $= \left(\frac{7}{2} \times \frac{5}{4} \right) + \left(\frac{10 - 7}{4} \right)$ $= \left(\frac{7}{2} \times \frac{5}{4} \right) + \frac{3}{4}$ $= \frac{7}{2} \times \frac{5}{4} \times \frac{4}{3}$ $= \frac{35}{6}$ <p><u>Denominator</u></p> $= 2.3 \div 4.6$ $= \frac{23}{10} \div \frac{46}{10}$ $= \frac{23}{10} \times \frac{10}{46}$ $= \frac{1}{2}$ <p><u>Whole statement</u></p> $= \text{Numerator} \div \text{Denominator}$ $= \frac{35}{6} \div \frac{1}{2}$ $= \frac{35}{6} \times \frac{2}{1}$ $= \frac{35}{3} = 11\frac{2}{3}$ <p><u>In 5 years time</u></p> $\text{Rukundo} = (5 + 5) = 10 \text{ yrs}$ $\text{Karimba} = (15 + 5) = 20 \text{ yrs}$ <p><u>Number of times</u></p> $= \frac{\text{Karimba's age}}{\text{Rukundo's age}}$ $= \frac{20 \text{ yrs}}{10 \text{ yrs}}$ $= 2 \text{ times}$ <p><u>Therefore Karimba will be twice (2 times) Rukundo's age in 5 years time.</u></p>																		
37	Teacher's guidance																				

WORKING & ANSWERS FOR PLE 2008

25	$ \begin{aligned} &= 4 \times m + 2 \times x - y \\ &= 4 \times -2 + 2 \times 0 - -3 \\ &= -8 + 0 + 3 \\ &= 3 - 8 \\ &= -5 \end{aligned} $	26	$ \begin{aligned} &1^{\text{st}} \text{distance} = 2^{\text{nd}} \text{distance} \\ &S \times T = S \times T \\ &40 \times \left(\frac{x+10}{60} \right) = 60 \times \frac{x}{60} \\ &2 \left(\frac{x+10}{3} \right) = x \\ &2x + 20 = 3x \\ &20 \text{km} = 3x - 2x \\ &x = 20 \text{km} \\ &\text{The distance is } 20 \text{km} \end{aligned} $	27	$ \begin{aligned} John &= x \\ Mary &= (2 \times x) = 2x \\ Joy &= \left(\frac{1}{2} \times 2x \right) = x \\ x + 2x + x &= 350,000 \text{ Frw} \\ \frac{4x}{4} &= \frac{350,000}{4} \\ x &= 87,500 \text{ Frw} \\ John &= 87,500 \text{ Frw} \\ Mary &= (2 \times 87,500) = 175,000 \text{ Frw} \\ Joy &= 87,500 \text{ Frw} \end{aligned} $															
28	$ \begin{aligned} &\text{1}^{\text{st}} \text{year} \\ &= \frac{P \times T \times R}{100} \\ &= \frac{1,000,000 \times 1 \times 12}{100} \\ &I = 120,000 \text{ Frw} \\ &A = 1,000,000F + 120,000F \\ &= 1,120,000 \text{ Frw} \\ &\text{2}^{\text{nd}} \text{year} \\ &= \frac{P \times T \times R}{100} \\ &= \frac{1,120,000 \times 1 \times 12}{100} \\ &I = 134,400 \text{ Frw} \\ &A = 1,120,000F + 134,400F \\ &= 1,254,400 \text{ Frw} \end{aligned} $	29	$ \begin{aligned} LCD &= 360 \\ \frac{2}{5} &= \frac{2}{5} \times 360 = 144 \dots (ii) \\ \frac{4}{9} &= \frac{4}{9} \times 360 = 160 \dots (iii) \\ \frac{11}{40} &= \frac{11}{40} \times 360 = 99 \dots (i) \\ &= \frac{11}{40}, \quad \frac{2}{5}, \quad \frac{4}{9} \end{aligned} $	30	$ \begin{aligned} 4s + 3s + 2s &= 180^{\circ}(n - 2) \\ 9s &= 180^{\circ}(3 - 2) \\ 9s &= 180^{\circ} \times 1 \\ \frac{9s}{9} &= \frac{180^{\circ}}{9} \\ s &= 20^{\circ} \\ 1^{\text{st}} \text{angle} &= 20^{\circ} \times 4 = 80^{\circ} \\ 2^{\text{nd}} \text{angle} &= 20^{\circ} \times 3 = 60^{\circ} \\ 3^{\text{rd}} \text{angle} &= 20^{\circ} \times 2 = 40^{\circ} \end{aligned} $															
31	$ \begin{aligned} H &= \sqrt{b^2 + h^2} \\ &= \sqrt{(5 \times 5) + (12 \times 12)} \\ &= \sqrt{25 \text{cm}^2 + 144 \text{cm}^2} \\ &= \sqrt{169 \text{cm}^2} \\ &= 13 \text{cm} \end{aligned} $ $ \begin{aligned} TSA &= (b \times h) + L(b + h + H) \\ &= (5 \times 12) \text{cm}^2 + 8(5 + 12 + 13) \\ &= 60 \text{cm}^2 + 8 \times 30 \text{cm}^2 \\ &= 60 \text{cm}^2 + 240 \text{cm}^2 \\ &= 300 \text{cm}^2 \end{aligned} $	32	$ \begin{aligned} &\text{Part (a)} \\ &4x - 4 = 2x + 8 \\ &4x - 2x = 8 + 4 \\ &\frac{2x}{2} = \frac{12}{2} \\ &x = 6 \end{aligned} $ $ \begin{aligned} &\text{Part (b)} \\ &\text{(Multiply the 3 terms by LCD)} \\ &6 \left(\frac{x}{3} \right) + 6(1) = 6 \left(\frac{x-2}{2} \right) \\ &2x + 6 = 3(x-2) \\ &2x + 6 = 3x - 6 \\ &2x - 3x = -6 - 6 \\ &\frac{-x}{-1} = \frac{-12}{-1} \\ &x = 12 \end{aligned} $	33	<table border="1"> <tr> <td>A</td> <td>+</td> <td>B</td> <td>=</td> <td>Mix</td> </tr> <tr> <td>120</td> <td>+</td> <td>x</td> <td>=</td> <td>(120+x)</td> </tr> <tr> <td>200</td> <td></td> <td>240</td> <td></td> <td>210</td> </tr> </table> $ \begin{aligned} (120 \times 200) + (240 \times x) &= 210(120+x) \\ 24,000 + 240x &= 25,200 + 210x \\ 240x - 210x &= 25,200 - 24,000 \\ 30x &= 1,200 \\ \frac{30x}{30} &= \frac{1,200}{30} \\ x &= 40 \text{kg} \end{aligned} $ <p>The second type has 40kg</p>	A	+	B	=	Mix	120	+	x	=	(120+x)	200		240		210
A	+	B	=	Mix																
120	+	x	=	(120+x)																
200		240		210																
34	$ \begin{aligned} &= \left(\frac{5}{4} - \frac{7}{10} \right) + \left(\frac{2}{3} + \frac{4}{9} \right) - \frac{1}{4} \\ &= \left(\frac{25-14}{20} \right) + \left(\frac{6+4}{9} \right) - \frac{1}{4} \\ &= \frac{11}{20} + \frac{10}{9} - \frac{1}{4} \\ &= \frac{99+200-45}{180} \\ &= \frac{299-45}{180} = \frac{254}{180} = \frac{127}{90} \\ &= 1\frac{37}{90} \end{aligned} $	35	$ \begin{aligned} x + 2x + 2.5x + 3x + 3.5x &= 180^{\circ}(n - 2) \\ 12x &= 180^{\circ}(5 - 2) \\ 12x &= 180^{\circ} \times 3 \\ 12x &= 540^{\circ} \\ \frac{12x}{12} &= \frac{540^{\circ}}{12} \\ x &= 45^{\circ} \\ 2x &= 45^{\circ} \times 2 = 90^{\circ} \\ 2.5x &= 45^{\circ} \times \frac{25}{10} = 112.5^{\circ} \\ 3x &= 45^{\circ} \times 3 = 135^{\circ} \\ 3.5x &= 45^{\circ} \times \frac{35}{10} = 157.5^{\circ} \end{aligned} $	36	Teacher's guidance															
37					$ \begin{aligned} &\text{Part (a)} \\ &12s = 96 \text{cm} \\ &\frac{96 \text{cm}}{12} \\ &= 8 \text{cm} \\ &\text{TSA} = 6 \times s \times s \\ &= 6 \times 8 \text{cm} \times 8 \text{cm} \\ &= 384 \text{cm}^2 \\ &= \frac{384}{100} \text{dm}^2 \\ &= 3.84 \text{dm}^2 \\ &\text{Part (b)} \\ &V = S \times S \times S \\ &= 8 \text{cm} \times 8 \text{cm} \times 8 \text{cm} \\ &= 512 \text{cm}^3 \end{aligned} $															

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1	$ \begin{aligned} &= \frac{5}{3} \div \frac{1}{9} \\ &= \frac{5}{3} \times \frac{9}{1} \\ &= 15 \end{aligned} $	2	$ \begin{aligned} \frac{2}{3} \times 900g &= \underline{\hspace{2cm}} \text{kg} \\ 600g &= \underline{\hspace{2cm}} \text{kg} \\ \frac{600}{1000} &= 0.6 \text{kg} \end{aligned} $	3	<table border="1"> <tr><td>2</td><td>858</td></tr> <tr><td>3</td><td>429</td></tr> <tr><td>11</td><td>143</td></tr> <tr><td>13</td><td>13</td></tr> <tr><td></td><td>1</td></tr> </table> <p>858 = $2 \times 3 \times 11 \times 13$</p>	2	858	3	429	11	143	13	13		1																		
2	858																																
3	429																																
11	143																																
13	13																																
	1																																
4	$ \begin{aligned} 3m - 5m &= -2 - 4 \\ -2m &= -6 \\ \frac{-2m}{-2} &= \frac{-6}{-2} \\ m &= 3 \end{aligned} $	5	$ \begin{aligned} 1960 &= 1000 + 900 + 60 \\ &= M + CM + LX \\ &= MCMLX \end{aligned} $	6	<table border="1"> <tr><td>2</td><td>21</td><td>45</td><td>50</td></tr> <tr><td>3</td><td>21</td><td>45</td><td>25</td></tr> <tr><td>3</td><td>7</td><td>15</td><td>25</td></tr> <tr><td>5</td><td>7</td><td>5</td><td>25</td></tr> <tr><td>5</td><td>7</td><td>1</td><td>5</td></tr> <tr><td>7</td><td>7</td><td></td><td>1</td></tr> <tr><td></td><td>1</td><td></td><td></td></tr> </table> <p>$= 2 \times 3 \times 3 \times 5 \times 5 \times 7$ $= 3,150$</p>	2	21	45	50	3	21	45	25	3	7	15	25	5	7	5	25	5	7	1	5	7	7		1		1		
2	21	45	50																														
3	21	45	25																														
3	7	15	25																														
5	7	5	25																														
5	7	1	5																														
7	7		1																														
	1																																
7	$ \begin{aligned} 6S^2 &= 150 \text{cm}^2 \\ \frac{6S^2}{6} &= \frac{150 \text{cm}^2}{6} \\ S^2 &= 25 \text{cm}^2 \\ \sqrt{S^2} &= \sqrt{25 \text{cm}^2} \\ S &= 5 \text{cm} \end{aligned} $ $ \begin{aligned} V &= S \times S \times S \\ &= (5 \times 5 \times 5) \text{cm}^3 \\ &= 125 \text{cm}^3 \end{aligned} $	8	$ \begin{aligned} &= 10y + 5x + 2x - 8y \\ &= 10y - 8y + 5x + 2x \\ &= 2y + 7x \end{aligned} $	9	$ \begin{aligned} x &= 40^\circ + 20^\circ \\ &= 60^\circ \end{aligned} $																												
10	<table border="1"> <tr><td>2</td><td>x</td><td>8</td><td>12</td></tr> <tr><td>5</td><td>17</td><td>65</td><td>y</td></tr> </table> $ \begin{aligned} x^2 + 1 &= y & x^2 + 1 &= y \\ x^2 + 1 &= 17 & 12^2 + 1 &= y \\ x^2 &= 17 - 1 & 12 \times 12 + 1 &= y \\ \sqrt{x^2} &= \sqrt{16} & 144 + 1 &= y \\ x &= 4 & 145 &= y \end{aligned} $	2	x	8	12	5	17	65	y	11	$ \begin{aligned} 1^{\text{st}} \text{no} &= x + 1 \\ 2^{\text{nd}} \text{no} &= x + 3 \\ 3^{\text{rd}} \text{no} &= x + 5 \\ 3x + 9 &= 57 \\ 3x &= 57 - 9 \\ \frac{3x}{3} &= \frac{48}{3} \\ x &= 16 \end{aligned} \quad \begin{aligned} 1^{\text{st}} &= 16 + 1 = 17 \\ 2^{\text{nd}} &= 16 + 3 = 19 \\ 3^{\text{rd}} &= 16 + 5 = 21 \end{aligned} $	12	$ \begin{aligned} &= \left(\frac{32}{10} \times \frac{28}{10} \right) \div \left(\frac{7}{10} \times \frac{8}{1} \right) \\ &= \frac{32}{10} \times \frac{28}{10} \times \frac{10}{7} \times \frac{1}{8} \\ &= \frac{8}{5} \\ &= 1.6 \end{aligned} $																				
2	x	8	12																														
5	17	65	y																														
13	<p>Let that number be x</p> $ \begin{aligned} &= 100\% + 15\% \\ &= 115\% \\ \frac{115}{100} \times x &= 3,450 \\ x &= \frac{3,450 \times 100}{115} \\ x &= 3,000 \text{Frw} \end{aligned} $	14	$ \begin{aligned} &= (60 \times 60)s + (60 \times 3)s + (2 \times 1)s \\ &= 3600 \text{sec} + 180 \text{sec} + 2 \text{sec} \\ &= 3,782 \text{sec} \end{aligned} $	15	$ \begin{aligned} P &= SP - CP \\ &= 2,640 \text{Frw} - 2,400 \text{Frw} \\ &= 240 \text{Frw} \\ \%P &= \frac{P}{CP} \times 100 \\ &= \frac{240}{2,400} \times 100 \\ &= 10\% \end{aligned} $																												
16	$ \begin{aligned} &= 7 + 0 + 4 + 7 + 0 \\ &= 18 \end{aligned} $ <p>The sum of digits (18) is divisible by 9.</p>	17	$ \begin{aligned} &= m^2 + 2ab - n \\ &= m \times m + 2 \times a \times b - n \\ &= 2 \times 2 + 2 \times 3 \times 1 - 4 \\ &= 4 - 6 + 4 \\ &= 4 + 4 - 6 \\ &= 8 - 6 \\ &= 2 \end{aligned} $	18	<p>Total parts = 2 + 3 = 5</p> $ \begin{aligned} \text{John} &= \frac{2}{5} \times 28,000 = 11,200 \text{F} \\ \text{Peter} &= \frac{3}{5} \times 28,000 = 16,800 \text{F} \end{aligned} $																												
19	$ \begin{aligned} \text{Ext} &= 180^\circ - \text{Int} \\ &= 180^\circ - 120^\circ \\ &= 60^\circ \\ n &= \frac{360^\circ}{\text{Ext}} = \frac{360^\circ}{60^\circ} = 6 \text{sides} \end{aligned} $	20	$ \begin{aligned} M &= D \times N \\ &= \frac{126 \text{kg}}{100 \text{m}^3} \times 60 \text{m}^3 \\ &= 75.6 \text{kg} \end{aligned} $	21	$ \begin{aligned} D &= S \times T \\ &= 60 \text{km/hr} \times \frac{20}{60} \text{hr} \\ &= 60 \text{km/hr} \times \frac{1}{3} \text{hr} \\ &= 60 \text{km/hr} \times \frac{4}{3} = 80 \text{km} \end{aligned} $																												
22	$ \begin{aligned} &= (212 - 141) + 1 \\ &= 71 + 1 \\ &= 72 \text{pages} \end{aligned} $	23	$ \begin{aligned} A &= \frac{b \times h}{2} \\ &= \frac{7 \text{cm} \times 16 \text{cm}}{2} \\ &= 56 \text{cm}^2 \end{aligned} $	24	$ \begin{aligned} 5 \text{men} &= 4 \text{days} \\ 1 \text{man} &= (4 \times 5) \text{days} \\ 8 \text{men} &= \left(\frac{4 \times 5}{8} \right) \text{days} \\ &= 2\frac{1}{2} \text{days} \end{aligned} $																												
25	$ \begin{array}{cccccc} 2 & , & 4 & , & 12 & , & 48 & , & \frac{240}{x_5} & , & \frac{1440}{x_6} \\ \hline & x_2 & & x_3 & & x_4 & & x_5 & & x_6 \end{array} $	26	$ \begin{aligned} 35 \text{km} &= 2.5 \text{litres} \\ 1 \text{km} &= \left(\frac{2.5}{35} \right) \text{litres} \\ 280 \text{km} &= \left(\frac{2.5 \times 280}{35} \right) \text{l} \\ 280 \text{km} &= 20 \text{litres} \\ 1 \text{litre} &= 600 \text{F} \\ 20 \text{litres} &= (600 \times 20) \text{Frw} \\ &= 12,000 \text{Frw} \end{aligned} $	27	$ \begin{aligned} \text{Rev} &= \frac{\text{Distance}}{\text{Circumference of wheel}} \\ C &= \pi D \\ &= \frac{(8.8 \times 100,000) \text{cm}}{220 \text{cm}} \\ &= \frac{22 \times 70 \text{cm}}{220 \text{cm}} \\ &= 880,000 \text{cm} \\ \text{Rev} &= \frac{8.8 \text{km}}{220 \text{cm}} \\ &= 4,000 \end{aligned} $																												

<p>28</p> $ \begin{aligned} A &= (\text{Trapezium}) + (\text{Trapezium}) \\ &= \frac{h(a+b)}{2} + \frac{h(a+b)}{2} \\ &= \frac{5(5+6)}{2} \text{ cm}^2 + \frac{3(6+4)}{2} \text{ cm}^2 \\ &= \frac{5 \times 11}{2} \text{ cm}^2 + \frac{3 \times 10}{2} \text{ cm}^2 \\ &= 27.5 \text{ cm}^2 + 15 \text{ cm}^2 \\ &= 42.5 \text{ cm}^2 \end{aligned} $	<p>29</p> $ \begin{aligned} \text{Cost of potatoes} &= p, \text{ beans} = (p + 70) \\ 3p + 4(p + 70) &= 840 \\ 3p + 4p + 280 &= 840 \\ 7p &= 840 - 280 \\ \frac{7p}{7} &= \frac{560}{7} \\ p &= 80 \end{aligned} $ <p><i>Beans</i> = (80 + 70) = 150 Frw/kg</p>	<p>30</p> $ \begin{aligned} I &= P \times T \times \frac{R}{100} \\ 12,000 &= 800,000 \times \frac{3}{12} \times \frac{R}{100} \\ 12,000 &= 2,000R \\ \frac{12,000}{2,000} &= \frac{2,000R}{2,000} \\ R &= 6\% \end{aligned} $
<p>31</p>  $ \begin{aligned} D_1 &= 10 \text{ cm} \\ D_2 &= 24 \text{ cm} \\ A &= \frac{D_1 \times D_2}{2} \\ &= \frac{10 \text{ cm} \times 24 \text{ cm}}{2} \\ &= 120 \text{ cm}^2 \end{aligned} $ <p>Part (b)</p> $ \begin{aligned} H &= \sqrt{b^2 + h^2} \\ &= \sqrt{(5 \times 5) + (12 \times 12) \text{ cm}^2} \\ &= \sqrt{25 \text{ cm}^2 + 144 \text{ cm}^2} \\ &= \sqrt{169 \text{ cm}^2} \\ &= 13 \text{ cm} \end{aligned} $ <p>$P = S \times 4$</p> $ \begin{aligned} &= 13 \text{ cm} \times 4 \\ &= 52 \text{ cm} \end{aligned} $	<p>32</p> <p><u>Numerator</u></p> $ \begin{aligned} &= \frac{1}{5} \times \left(\frac{27}{4} - \frac{475}{100} \right) \times \left(\frac{3875}{1000} - \frac{19}{8} \right) \\ &= \frac{1}{5} \times \left(\frac{27}{4} - \frac{19}{4} \right) \times \left(\frac{31}{8} - \frac{19}{8} \right) \\ &= \frac{1}{5} \times \left(\frac{27 - 19}{4} \right) \times \left(\frac{31 - 19}{8} \right) \\ &= \frac{1}{5} \times \frac{8}{4} \times \frac{12}{8} \\ &= \frac{3}{5} \end{aligned} $ <p><u>Denominator</u></p> $ \begin{aligned} &= \left(\frac{15}{10} \times \frac{15}{10} \right) \div \frac{5}{2} \\ &= \frac{15}{10} \times \frac{15}{10} \times \frac{2}{5} \\ &= \frac{9}{10} \end{aligned} $ <p><u>Whole statement</u></p> $ \begin{aligned} &= \text{Numerator} \div \text{Denominator} \\ &= \frac{3}{5} \div \frac{9}{10} = \frac{3}{5} \times \frac{10}{9} = \frac{2}{3} \end{aligned} $	<p>33</p> <p><u>First commission</u></p> $ \begin{aligned} &= \frac{10}{100} \times 50,000,000 \text{ Frw} \\ &= 5,000,000 \text{ Frw} \end{aligned} $ <p><i>Rest</i> = 90000000 - 50000000</p> $ \begin{aligned} &= 40,000,000 \text{ Frw} \end{aligned} $ <p><u>Second commission</u></p> $ \begin{aligned} &= \frac{3}{100} \times 40,000,000 \text{ Frw} \\ &= 1,200,000 \text{ Frw} \end{aligned} $ <p><u>Tax</u> = $\frac{5}{100} \times 90,000,000 \text{ Frw}$</p> $ \begin{aligned} &= 4,500,000 \text{ Frw} \end{aligned} $ <p><u>Importer receives</u></p> $ \begin{aligned} &= \text{Total sales} - (\text{Tot. comm.} + \text{tax}) \\ &= 90,000,000 - (5,000,000 + 1,200,000 + 4,500,000) \\ &= 90,000,000 - 10,700,000 \\ &= 79,300,000 \text{ Frw} \end{aligned} $
<p>34</p> <p><u>Part (a)</u></p> $ \begin{aligned} \text{LCD} &= 2x \\ 2x \left(\frac{2x-4}{x} \right) - 2x \left(\frac{6x+2}{2x} \right) &= 2x(0) \\ 2(2x-4) - (6x+2) &= 0 \\ 4x - 8 - 6x - 2 &= 0 \\ 4x - 6x - 8 - 2 &= 0 \\ -2x - 10 &= 0 \\ -2x &= 10 \\ \frac{-2x}{2} &= \frac{10}{2} \\ x &= -5 \end{aligned} $ <p><u>Part (b)</u></p> <p>Let that number be x</p> $ \begin{aligned} x \times 4 &= x + 6 \\ 4x &= x + 6 \\ 4x - x &= 6 \\ 3x &= 6 \\ \frac{3x}{3} &= \frac{6}{3} \\ x &= 2 \end{aligned} $	<p>35</p> <p><u>Part (a)</u></p> $ \begin{aligned} 11 \text{ yrs} &= 360^\circ - (85 + 45 + 90 + 55 + 60)^\circ \\ &= 360^\circ - 335^\circ \\ &= 25^\circ \end{aligned} $ <p><u>Pupils</u> = $\frac{10 \times 360}{25} = 144 \text{ pupils}$</p> <p><u>Part (b)</u></p> $ \begin{aligned} &= \frac{144}{360} = \frac{2}{5} \\ 12 \text{ yrs} &= \frac{2}{5} \times 90 = 36 \text{ pupils} \end{aligned} $ $ \begin{aligned} 13 \text{ yrs} &= \frac{2}{5} \times 45 = 18 \text{ pupils} \\ 14 \text{ yrs} &= \frac{2}{5} \times 85 = 34 \text{ pupils} \\ 15 \text{ yrs} &= \frac{2}{5} \times 55 = 22 \text{ pupils} \\ 16 \text{ yrs} &= \frac{2}{5} \times 60 = 24 \text{ pupils} \end{aligned} $	<p>36</p> <p>$c = 60^\circ$ (Corresponding angles)</p> <p>$b = 180^\circ - (40^\circ + 60^\circ)$ (triangle)</p> $ \begin{aligned} &= 180^\circ - 100^\circ \\ &= 80^\circ \end{aligned} $ <p>$d = b = 80^\circ$ (opposite angles)</p> <p>$e = 180^\circ - b$ (straight line)</p> $ \begin{aligned} &= 180^\circ - 80^\circ \\ &= 100^\circ \end{aligned} $ <p>$a = e = 100^\circ$ (opposite angles)</p> <p>$g = d = 80^\circ$ (alternate angles)</p> <p>$f = a = 100^\circ$ (corr. angles)</p>
<p>37</p> <p><u>x-axis</u></p> $ \begin{aligned} 20 \text{ sq} &= 1 \text{ hr} \\ 20 \text{ sq} &= 60 \text{ min} \\ &\quad 60 \\ 1 \text{ sq} &= \frac{60}{20} \text{ min} \\ 1 \text{ sq} &= 3 \text{ min} \end{aligned} $ <p><u>y-axis</u></p> $ \begin{aligned} 10 \text{ sq} &= 10 \text{ km} \\ 1 \text{ sq} &= 1 \text{ km} \end{aligned} $	<p>(a). 10 sq on y-axis = 10 km</p> <p>(b). 10 sq on x-axis = $(10 \times 3) = 30 \text{ min}$</p> <p>Time = 10:30am</p> <p>(c). 5 sq on y-axis = 5 km</p> <p>(d). At 11:00am = 15 sq on y-axis = 15 km</p> <p>(e). $AS = \frac{\text{Total distance}}{\text{Total time taken}} = \frac{20 \text{ km} + 5 \text{ km} + 15 \text{ km}}{30 \text{ min} + 30 \text{ min} + 1 \text{ hour}} = \frac{40 \text{ km}}{2 \text{ hr}} = 20 \text{ km/hr}$</p>	

WORKING & ANSWERS FOR PLE 2006

1	$= \left(\frac{25}{100} \times 600 \right) + \left(40 \times \frac{8}{5} \right)$ = 150 + 64 = 214	2	$y = 151^\circ$ (corresp. angles) $x = 180^\circ - 151^\circ$ = 29°	3	$S = D \div T$ = $100\text{km} \div \frac{4}{3}\text{hr}$ = $100\text{km} \times \frac{3}{4}\text{hr} = 75\text{km}$																								
4	$4 + 10 = 5x - 2x$ $10 - 4 = 3x$ $6 = 3x$ $\frac{6}{3} = \frac{3x}{3}$ $x = 2$	5	$= \frac{\frac{11}{6} - \frac{7}{12}}{22 - 7}$ (LCD = 12) = $\frac{12}{12} = \frac{5}{4} = 1\frac{1}{4}$	6	<table border="1"> <tr><td>2</td><td>15</td><td>24</td><td>30</td></tr> <tr><td>2</td><td>15</td><td>12</td><td>15</td></tr> <tr><td>2</td><td>15</td><td>6</td><td>15</td></tr> <tr><td>3</td><td>15</td><td>3</td><td>15</td></tr> <tr><td>5</td><td>5</td><td>1</td><td>5</td></tr> <tr><td>1</td><td></td><td>1</td><td></td></tr> </table> $= 2 \times 2 \times 2 \times 3 \times 5$ $= 120$	2	15	24	30	2	15	12	15	2	15	6	15	3	15	3	15	5	5	1	5	1		1	
2	15	24	30																										
2	15	12	15																										
2	15	6	15																										
3	15	3	15																										
5	5	1	5																										
1		1																											
7	$= (4 \div 2)a^{(2-1)}b^{(3-2)}$ = $2ab$	8	$1^{\text{st}} \text{ no} = \frac{48 + 12}{2} = \frac{60}{2} = 30$ $2^{\text{nd}} \text{ no} = \frac{48 - 12}{2} = \frac{36}{2} = 18$	9	$a = 163^\circ - 80^\circ$ $a = 83^\circ$																								
10	$ \begin{array}{r} 3 \quad 9 \quad 6 \quad 4 \\ - \quad 1 \quad 7 \quad 0 \quad 5 \\ \hline 2 \quad 2 \quad 5 \quad 9 \end{array} $ Ones: $5 + 9 = 14$ (write 4) Tens: $6 - 1 = 5$, ($5 - 5 = 0$) Hundreds: $7 + 2 = 9$ Thousands: $3 - 2 = 1$	11	$(0.54 = \frac{27}{50}), (\frac{32}{80} = \frac{2}{5})$ (LCD = 150) $\frac{27}{50} \times 150 = 81 \dots \dots \text{(ii)}$ $\frac{2}{3} \times 150 = 100 \dots \dots \text{(iii)}$ $\frac{2}{5} \times 150 = 60 \dots \dots \text{(i)}$ $\text{Asc. order} = \frac{32}{80}, 0.54, \frac{2}{3}$	12	$= 3x - 6y - 2x - 2y + 15y$ $= 3x - 2x + 15y - 6y - 2y$ $= x + 15y - 8y$ $= x + 7y$																								
13	<table border="1"> <tr><td>2</td><td>20</td><td>50</td><td>70</td></tr> <tr><td>5</td><td>10</td><td>25</td><td>35</td></tr> <tr><td>2</td><td>5</td><td>7</td><td></td></tr> </table> $\text{HCD} = 2 \times 5 = 10$	2	20	50	70	5	10	25	35	2	5	7		14	$= \frac{25 + 15}{4}$ $= \frac{40}{4} = 10$	15	<table border="1"> <tr><td>10</td><td>5</td><td>2</td><td>1</td></tr> <tr><td>0.1</td><td>0.2</td><td>0.5</td><td>1</td></tr> </table> $y = 1 \div x \quad y = 1 \div x$ $y = 1 \div 5 \quad y = 1 \div 1$ $y = 0.2 \quad y = 1$	10	5	2	1	0.1	0.2	0.5	1				
2	20	50	70																										
5	10	25	35																										
2	5	7																											
10	5	2	1																										
0.1	0.2	0.5	1																										
16	$= 160\text{cm} : 5\text{m}$ $= 160\text{cm} : (5 \times 1000\text{cm})$ $= 160\text{cm} : 500\text{cm}$ $= \frac{160\text{cm}}{500\text{cm}}$ $= \frac{8}{25}$ $= 8 : 25$	17	$= 180^\circ(n - 2)$ $= 180^\circ(15 - 2)$ $= 180^\circ \times 13$ $= 2,340^\circ$	18	$L = L, \quad W = (L - 2)$ $P = 24\text{cm}$ $2(L + W) = 24\text{cm}$ $2(L + L - 2) = 24\text{cm}$ $4L - 4 = 24\text{cm}$ $4L = 24\text{cm} + 4\text{cm}$ $\frac{4L}{4} = \frac{28\text{cm}}{4}$ $L = 7\text{cm}$ $W = 7 - 2 = 5\text{cm}$ $= 7\text{cm} \times 5\text{cm}$ $= 35\text{cm}^2$																								
19	$P = \frac{I \times 100}{T \times R}$ $= \frac{40,000 \times 100}{2 \times 5}$ $= 400,000\text{Frw}$	20	$= 6 \times 2$ $= 12 \text{ triangles}$	21	$30 \text{ eggs} = 1800\text{g}$ $1 \text{ egg} = \left(\frac{1800}{30} \right) \text{g}$ $12 \text{ eggs} = \left(\frac{1800 \times 12}{30} \right) \text{g}$ $= 720\text{g}$																								
22	$5\text{km} = 1\text{cm}$ $1\text{km} = \frac{1\text{cm}}{5\text{km}} = \frac{1\text{cm}}{(5 \times 1,000,000)\text{cm}}$ $2\text{km} = \frac{(2 \times 1,000,000)\text{cm}}{(5 \times 1,000,000)\text{cm}}$ $= 0.4\text{cm}$	23	$= 100\% + 20\%$ $= 120\%$ $\frac{120}{100} \times CP = 54,000\text{Frw}$ $CP = \frac{54,000 \times 100}{120}$ $CP = 45,000\text{Frw}$	24	$1, 3, 12, 60, \frac{360}{x3}, \frac{2520}{x7}$																								
25	$\text{Let a pen cost } x \text{ and a pencil } y$ $x + y = 150 \dots \text{(i)}$ $4x + 5y = 650 \dots \text{(ii)}$ $4(x + y = 150)$ $1(4x + 5y = 650)$ $4x + 4y = 600$ $4x + 5y = 650$ $5y - 4y = 650 - 600$ $y = 50$ (A pencil costs 50Frw) $x = 150 - 50$ $x = 100$ (A pen costs 100Frw)	26	$\text{1}^{\text{st}} \text{ year}$ $= \frac{50,000 \times 1 \times 8}{100}$ Amount $50,000$ $+ 4,000$ $\underline{54,000}$ $I = 4,000\text{Frw}$ $\text{2}^{\text{nd}} \text{ year}$ $= \frac{54,000 \times 1 \times 8}{100}$ Comp. Interest $4,000 \text{ Frw}$ $+ 4,320 \text{ Frw}$ $\underline{8,320 \text{ Frw}}$ $I = 4,320\text{Frw}$	27	$= 100\% - 20\%$ $= 80\%$ $\frac{80}{100} \times CP = 1,000$ $CP = \frac{1,000 \times 100}{80}$ $CP = 1,250$ $2kg = 1,250\text{frw}$ $1kg = (1,250 \div 2)\text{Frw}$ $= 625\text{Frw}$																								

28	$P = 36\text{cm}$ $C + D = 36\text{cm}$ $\frac{1}{2}\pi D + D = 36$ $\frac{1}{2} \times \frac{22}{7}D + D = 36$ $\frac{11D}{7} + D = 36$ $D = 36 \times 7$ $\frac{18D}{18} = \frac{36 \times 7}{18}$ $D = 14\text{cm}$ $r = \frac{D}{2} = \frac{14\text{cm}}{2} = 7\text{cm}$ $A = \frac{1}{2}\pi r^2$ $A = \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$ $A = 77\text{cm}^2$	29	$Tiles = \frac{\text{Area of rectangular path}}{\text{Area of each square tile}}$ $= \frac{L \times W}{S \times S}$ $= \frac{40\text{m} \times 1.2\text{m}}{20\text{cm} \times 20\text{cm}}$ $= \frac{48\text{m}^2}{400\text{cm}^2}$ $= \frac{(48 \times 10,000)\text{cm}^2}{400\text{cm}^2}$ $= 1,200 \text{ tiles}$	30	<table border="1"> <tr> <th>A</th> <th>+</th> <th>B</th> <th>=</th> <th>Mix</th> </tr> <tr> <td>100</td> <td>+</td> <td>200</td> <td>=</td> <td>300</td> </tr> <tr> <td>180</td> <td></td> <td>150</td> <td></td> <td>x</td> </tr> </table> $(100 \times 180) + (200 \times 150) = (300 \times x)$ $18,000 + 30,000 = 300x$ $48,000 = 300x$ $\frac{48,000}{300} = \frac{300x}{300}$ $x = 160\text{F}$	A	+	B	=	Mix	100	+	200	=	300	180		150		x
A	+	B	=	Mix																
100	+	200	=	300																
180		150		x																
31	$h = \sqrt{H^2 - b^2}$ $= \sqrt{(10 \times 10)\text{cm}^2 - (6 \times 6)}$ $= \sqrt{100\text{cm}^2 + 36\text{cm}^2}$ $= \sqrt{64\text{cm}^2}$ $= 8\text{cm}$ $P = b + h + H$ $= 6\text{cm} + 8\text{cm} + 10\text{cm}$ $= 24\text{cm}$ $A = \frac{b \times h}{2} = \frac{6\text{cm} \times 8\text{cm}}{2} = 24\text{cm}^2$	32	<p><u>Part (a)</u></p> $5(x + 1) = 4(x + 3)$ $5x + 5 = 4x + 12$ $5x - 4x = 12 - 5$ $x = 7$ <p><u>Part (b)</u></p> $substitution \ x = 7$ $= \frac{x \times x - 2 \times x - 14}{7 \times 7 - 2 \times 7 - 14}$ $= \frac{49 - 14 - 14}{7}$ $= \frac{49 - 28}{7} = \frac{21}{7} = 3$	33	$D = 44\text{cm}, R = (44 \div 2) = 22\text{cm}$ $d = 40\text{cm}, r = (40 \div 2) = 20\text{cm}$ $h = 10\text{m} = (10 \times 100) = 1000\text{cm}$ $V = \text{Vol of outer} - \text{inner cylinder}$ $= \pi R^2 h - \pi r^2 h$ $= \pi h(R^2 - r^2)$ $= 3.14 \times 1000(22 \times 22 - 20 \times 20)$ $= 3140\text{cm}(484 - 400)\text{cm}^2$ $= 3140\text{cm} \times 84\text{cm}^2$ $= 263,760\text{cm}^3$															
34	$Time = \frac{\text{Product of time (POT)}}{\text{Sum of time (SOT)}}$ $= \frac{5 \times 7}{5 + 7} = \frac{35}{12} = 2\frac{11}{12}\text{hrs}$ $= 2hr \left(\frac{11}{12} \times 60\right) \text{min}$ $= 2hr \ 55\text{min}$	35	$Boxing = 360^\circ - (108 + 126 + 54)$ $= 360^\circ - 288^\circ$ $= 72^\circ$ $Fraction \ to \ be \ used = \frac{40}{360} = \frac{1}{9}$ $Boxing = \frac{1}{9} \times 72 = 8 \text{ students}$ $Tennis = \frac{1}{9} \times 54 = 6 \text{ students}$ $Football = \frac{1}{9} \times 126 = 14 \text{ students}$ $Volleyball = \frac{1}{9} \times 108 = 12 \text{ students}$	36	<p><u>Part (a)</u></p> $1\text{day} = 10\text{kg}$ $(1\text{ week})7\text{days} = (10 \times 7)\text{kg}$ $= 70\text{kg}$ <p><u>Part (b)</u></p> $1\text{kg} = 600\text{Frw}$ $70\text{kg} = (600 \times 70)\text{Frw}$ $= 42,000\text{Frw}$ <p><u>Part (c)</u></p> $Not \ used = (50,000 - 42,000)\text{Frw}$ $= 8,000\text{Frw}$ $\% Not \ used = \frac{8,000}{50,000} \times 100$ $= 16\%$															
37	<p><u>x-axis</u></p> $10\text{sq} = 1\text{hr}$ $10\text{sq} = 60\text{min}$ $1\text{sq} = (60 \div 10)\text{min}$ $1\text{sq} = 6\text{min}$ <p><u>y-axis</u></p> $10\text{sq} = 10\text{km}$ $1\text{sq} = (10 \div 10)\text{km}$ $1\text{sq} = 1\text{km}$	<p>(a). $6\text{min} = 1\text{km}$ (<i>The car travels 1km in 6 minutes</i>)</p> <p>(b). $15\text{km} = (15 \times 6)\text{min}$ $= 90\text{min}$ $= \frac{90}{60} \text{ hr} = 1\frac{1}{2}\text{hr}$ (<i>The car takes 1hr 30min to travel 15km</i>)</p> <p>(c). $= 10 \text{ sq on x-axis}$ $= (10 \times 6)\text{min}$ $= 60\text{min} = 1\text{hour}$ (<i>The car stops for 1 hour</i>)</p> <p>(d). $AS = \frac{\text{Total distance}}{\text{Total time taken}} = \frac{20\text{km} + 30\text{km}}{2\text{hr} + 1\text{hr} + 2\text{hr}} = \frac{50\text{km}}{5\text{hr}} = 10\text{km/hr}$ <i>(The average speed of the car for the whole journey was 10km/hr)</i></p>																		

WORKING & ANSWERS FOR PLE 2005

1	$ \begin{aligned} &= \left(\frac{7}{3} \times \frac{9}{14} \right) + \frac{3}{4} \\ &= \frac{3}{2} + \frac{3}{4} = \frac{6+3}{4} = \frac{9}{4} = 2\frac{1}{4} \end{aligned} $	2	$ \begin{aligned} 8x - 2x &= 5 + 7 \\ 6x &= 12 \\ \frac{6x}{6} &= \frac{12}{6} \\ x &= 2 \end{aligned} $	3	$ \begin{aligned} \text{Total parts} &= 3 + 7 = 10 \\ 1^{\text{st}} \text{ share} &= \frac{3}{10} \times 10,000 = 3,000 \text{ kg} \\ 2^{\text{nd}} \text{ share} &= \frac{7}{10} \times 10,000 = 7,000 \text{ kg} \end{aligned} $																				
4	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>3</td><td>45</td><td>60</td></tr> <tr><td>5</td><td>15</td><td>20</td></tr> <tr><td></td><td>3</td><td>4</td></tr> </table> $ \text{HCF} = 3 \times 5 = 15 $	3	45	60	5	15	20		3	4	5	$ \begin{aligned} &= 4m - 12n + 12 - 3m + 3n - 12 \\ &= 4m - 3m + 3n - 12n + 12 - 12 \\ &= m - 9n \end{aligned} $	6	$ \begin{aligned} x &= 360^\circ - (145^\circ + 160^\circ) \\ &= 360^\circ - 305^\circ \\ &= 55^\circ \end{aligned} $											
3	45	60																							
5	15	20																							
	3	4																							
7	$ A = \frac{b \times h}{2} = \frac{6\text{cm} \times 10\text{cm}}{2} = 30\text{cm}^2 $	8	$ \begin{aligned} &= \frac{8}{10} \div \frac{5}{100} \\ &= \frac{8}{10} \times \frac{100}{5} = 16 \end{aligned} $	9	$ \begin{aligned} I &= P \times T \times \frac{R}{100} \\ &= 240,000 \times \frac{8}{12} \times \frac{5}{100} \\ &= 8,000 \text{ Frw} \end{aligned} $																				
10	$ \begin{aligned} C &= 2\pi r \\ &= 2 \times 3.14 \times 5\text{cm} \\ &= 31.4\text{cm} \end{aligned} $	11	$ \begin{aligned} m &= 30^\circ \text{ (corr. angles)} \\ n &= 180^\circ - 30^\circ \text{ (straight line)} \\ &= 150^\circ \end{aligned} $	12	$ \begin{aligned} D &= M \div V \\ &= 96\text{g} \div 12\text{cm}^3 \\ &= 8\text{g/cm}^3 \end{aligned} $																				
13	$ \begin{aligned} &= \frac{162}{9} + \frac{2 \times 80}{10} \\ &= 18 + 16 \\ &= 34 \end{aligned} $	14	$ \begin{aligned} \text{TSA} &= 24\text{cm}^2 \\ 6S^2 &= 24\text{cm}^2 \\ \frac{6S^2}{6} &= \frac{24\text{cm}^2}{6} \\ S^2 &= 4\text{cm}^2 \quad V = S \times S \times S \\ \sqrt{S^2} &= \sqrt{4\text{cm}^2} \quad = 2\text{cm} \times 2\text{cm} \times 2\text{cm} \\ S &= 2\text{cm} \quad = 8\text{cm}^3 \end{aligned} $	15	$ \begin{aligned} 6km &= (6 \times 1000)m \\ &= 6,000m \\ 50\text{min} &= (50 \times 60)\text{sec} \\ &= 3,000\text{sec} \\ S &= \frac{D}{T} = \frac{6,000m}{3,000s} = 2\text{m/s} \end{aligned} $																				
16	$ \begin{aligned} \text{Let his old salary be } x \\ \frac{3}{100} \times x &= 9,000 \\ x &= \frac{9000 \times 100}{3} = 300,000 \text{ Frw} \\ \text{New salary} &= \text{Old salary} + \text{increase} \\ &= 300,000F + 9,000F \\ &= 309,000 \text{ Frw} \end{aligned} $	17	$ \begin{array}{cccccccc} 2 & , & 5 & , & 10 & , & 17 & , & 28 & , & 41 & , & 58 \\ \downarrow & & \downarrow \\ +3 & & +5 & & +7 & & +11 & & +13 & & +17 & & \end{array} $	18	$ \begin{aligned} P &= SP - CP \\ &= 75,000 \text{ Frw} - 60,000 \text{ Frw} \\ &= 15,000 \text{ Frw} \\ \%P &= \frac{P}{CP} \times 100 \\ &= \frac{15,000}{60,000} \times 100 \\ &= 25\% \end{aligned} $																				
19	$ \begin{aligned} P &= S \times 4 \\ &= 5\text{cm} \times 4 \\ &= 20\text{cm} \end{aligned} $	20	$ \begin{aligned} \frac{x+3+5+7+8}{5} &= 5 \\ \frac{x+23}{5} &= 5 \\ x+23 &= 5 \times 5 \\ x &= 25 - 23 \\ x &= 2 \end{aligned} $	21	$ \begin{aligned} 30 \text{ eggs} &= 1,500 \text{ Frw} \\ 1 \text{ egg} &= \left(\frac{1,500}{30} \right) \text{ Frw} \\ 12 \text{ eggs} &= \left(\frac{1,500 \times 12}{30} \right) \text{ Frw} \\ &= 600 \text{ Frw} \end{aligned} $																				
22	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>4</td><td>5</td><td>x</td><td>10</td></tr> <tr><td>5</td><td>9</td><td>y</td><td>19</td><td>21</td></tr> </table> $ \begin{aligned} 2x+1 &= y & 2x+1 &= y \\ 2 \times 5 + 1 &= y & 2x+1 &= 19 \\ 10 + 1 &= y & 2x &= 19 - 1 \\ 11 &= y & 2x &= \frac{18}{2} \\ & & x &= 9 \end{aligned} $	2	4	5	x	10	5	9	y	19	21	23	$ \begin{aligned} 4 \text{ boys} &= 9 \text{ days} \\ 1 \text{ boy} &= (9 \times 4) \text{ days} \\ 6 \text{ days} &= \left(\frac{9 \times 4}{6} \right) \text{ days} \\ &= 6 \text{ days} \end{aligned} $	24	$ \begin{aligned} &= m \times m \times p - 2 \times n \times p \\ &= 2 \times 2 \times 3 - 2 \times 4 \times 3 \\ &= 12 + 24 \\ &= 36 \end{aligned} $										
2	4	5	x	10																					
5	9	y	19	21																					
25	$ \begin{aligned} \text{Hint: Express 181 as a sum of two} \\ \text{square numbers then find their} \\ \text{square roots.} \\ 181 &= 100 + 81 \\ 1^{\text{st}} &= \sqrt{100} = 10 \\ 2^{\text{nd}} &= \sqrt{81} = 9 \end{aligned} $	26	$ \begin{aligned} \frac{3 \times 5}{5 \times 5} &= \frac{15}{25}, \quad \frac{60+5}{125+5} = \frac{12}{25}, \\ \frac{39+3}{75+3} &= \frac{13}{25}, \\ 0.56 &= \frac{56 \div 4}{100 \div 4} = \frac{14}{25} \\ \text{All fractions have the same denominators,} \\ \text{arrange considering the numerators.} \\ &= \frac{15}{25}, \frac{14}{25}, \frac{13}{25}, \frac{12}{25} \\ &= \frac{3}{5}, 0.56, \frac{39}{75}, \frac{60}{125} \end{aligned} $	27	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>2</td><td>4</td><td>6</td><td>10</td></tr> <tr><td>2</td><td>2</td><td>3</td><td>5</td></tr> <tr><td>3</td><td>1</td><td>3</td><td>5</td></tr> <tr><td>5</td><td></td><td>1</td><td>5</td></tr> <tr><td></td><td></td><td></td><td>1</td></tr> </table> $ \begin{aligned} \text{LCM} &= 2 \times 2 \times 3 \times 5 \\ &= 60 \text{ min} \\ &= (60 \div 60) \text{ hr} \\ &= 1 \text{ hour} \end{aligned} $	2	4	6	10	2	2	3	5	3	1	3	5	5		1	5				1
2	4	6	10																						
2	2	3	5																						
3	1	3	5																						
5		1	5																						
			1																						

28	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td><td style="width: 10%; text-align: center;">+</td><td style="width: 10%; text-align: center;">B</td><td style="width: 10%; text-align: center;">=</td><td style="width: 10%; text-align: center;">Mix</td></tr> <tr> <td style="text-align: center;">40</td><td style="text-align: center;">+</td><td style="text-align: center;">x</td><td style="text-align: center;">=</td><td style="text-align: center;">$(40 + x)$</td></tr> <tr> <td style="text-align: center;">200</td><td></td><td style="text-align: center;">120</td><td></td><td style="text-align: center;">160</td></tr> </table> <p style="margin-top: 10px;"> $(200 \times 40) + (120 \times x) = 160(40 + x)$ $8,000 + 120x = 6,400 + 160x$ $8,000 - 6,400 = 160x - 120x$ $1,600 = 40x$ $\frac{1,600}{40} = \frac{40x}{40}$ $x = 40$ </p> <p><i>Quantity of maize is 40kg</i></p>	A	+	B	=	Mix	40	+	x	=	$(40 + x)$	200		120		160	<p>Part (a) Let total number be t</p> $\frac{110}{360} \times t = 220 \text{ Teachers}$ $t = \frac{220 \times 360}{110} = \frac{10 \times 720}{360} = 20$ $t = 720$ <p>Part (b)</p> <p>Boys = Total - (Girls + teachers)</p> $= 720 - (220 + 20)$ $= 720 - 240$ $= 480 \text{ boys}$	<p>C = $180^\circ - (90^\circ + 20^\circ)$ (triangle) = $180^\circ - 110^\circ$ = 70°</p> <p>b = C = 70° (Isosceles triangle)</p> <p>a = 20° (Symmetry line)</p> <p>Symmetry lines divides the triangle into two equal angles and two equal right angled triangles.</p>															
A	+	B	=	Mix																													
40	+	x	=	$(40 + x)$																													
200		120		160																													
31	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">x</th> <th style="width: 10%;">f</th> <th style="width: 10%;">fx</th> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">3</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">9</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">7</td> <td style="text-align: center;">35</td> </tr> <tr> <td style="text-align: center;">6</td> <td style="text-align: center;">1</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">7</td> <td style="text-align: center;">2</td> <td style="text-align: center;">14</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;">Tf = 25</td> <td style="text-align: center;">Tfx = 89</td> </tr> </table> <p>Part (b)</p> $\text{Average} = \frac{Tfx}{Tf} = \frac{89}{25} = 3.56$	x	f	fx	0	3	0	1	3	3	2	1	2	3	3	9	4	5	20	5	7	35	6	1	6	7	2	14	Total	Tf = 25	Tfx = 89	<p>$12x + 60^\circ = 180^\circ(n - 2)$ $12x + 60^\circ = 180^\circ(5 - 2)$ $12x + 60^\circ = 180^\circ \times 3$ $12x + 60^\circ = 540^\circ$ $12x = 540^\circ - 60^\circ$ $12x = 480^\circ$ $\frac{12x}{12} = \frac{480^\circ}{12}$ $x = 40^\circ$</p> <p style="text-align: center;">$2x = 2 \times 40^\circ = 80^\circ$ $(3 \times 40^\circ + 11^\circ) = 120^\circ + 11^\circ = 131^\circ$ $(2 \times 40^\circ + 34^\circ) = 80^\circ + 34^\circ = 114^\circ$ $(2 \times 40^\circ + 11^\circ) = 80^\circ + 11^\circ = 91^\circ$ $(3 \times 40^\circ + 4^\circ) = 120^\circ + 4^\circ = 124^\circ$</p>	<p>4 months = $\frac{4}{12} = \frac{1}{3} \text{ yr (3 times)}$ 1st third of a year</p> $I = 250,000 \times \frac{1}{3} \times \frac{9}{100} = 7,500F$ $A = 250,000 + 7,500 = 257,500F$ <p>2nd third of a year</p> $I = 257,500 \times \frac{1}{3} \times \frac{9}{100} = 7,725F$ $A = 257,500 + 7,725 = 265,225F$ <p>3rd third of a year (Beg. of year)</p> $I = 265,225 \times \frac{1}{3} \times \frac{9}{100} = 7,956.75F$ $A = 265,225 + 7,956.75$ $= 273,181.75Frw$
x	f	fx																															
0	3	0																															
1	3	3																															
2	1	2																															
3	3	9																															
4	5	20																															
5	7	35																															
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Total	Tf = 25	Tfx = 89																															
34	<p>Part (a)</p> <p>(i). $\text{Ang. } ABD = (60^\circ \div 2) = 30^\circ$ (ii). $\text{Ang. } ADB = 180^\circ - (60^\circ + 30^\circ)$ = $180^\circ - 90^\circ$ = 90°</p> <p>(iii). $\text{Ang. } DAE = (90^\circ \div 20) = 45^\circ$</p> <p>(b). $\overline{AD} = (10 \text{ cm} \div 2) = 5 \text{ cm}$</p> <p>(c). $\frac{b \times h}{2} = \frac{(5 \times 8.7)}{2} = 21.75 \text{ cm}^2$</p> <p>(d). $\text{BAE} = \text{BAD} + \text{DAE}$ = $60^\circ + 45^\circ$ = 105°</p>	<p>Part (a)</p> <p>Distance covered by cyclist before motorist started moving</p> $D = S \times T = 15 \text{ km/hr} \times 2 \text{ hr} = 30 \text{ km}$ <p>Time taken by motorist to catch up with cyclist</p> $T = \frac{D}{S_2 - S_1} = \frac{30 \text{ km}}{45 - 15} = \frac{30}{30} = 1 \text{ hr}$ <p>Distance from Kigali covered when motorist overtake cyclist</p> $D = S \times T = 45 \text{ km/hr} \times 1 \text{ hr} = 45 \text{ km}$ <p>Part (b)</p> $T = 8:00 \text{ am} + 2 \text{ hr} + 1 \text{ hr}$ $= 11:00 \text{ am}$	<p>Part (a) (Teacher's guidance)</p> <p>Part (b)</p> $TSA = 2(LW + WH + LH)$ $= 2(12 \times 6 + 6 \times 5 + 12 \times 5) \text{ cm}^2$ $= 2(72 + 30 + 60) \text{ cm}^2$ $= 2 \times 162 \text{ cm}^2$ $= 324 \text{ cm}^2$ <p>Part (c)</p> $V = L \times W \times H$ $= 12 \text{ cm} \times 6 \text{ cm} \times 5 \text{ cm}$ $= 360 \text{ cm}^3$																														
37	<p>Part (a) (Teacher's guidance)</p> <p>Part (b)</p> <p><i>x-axis</i> (b). $23 \text{ km} = 4h (3 \times 12) \text{ min}$</p> <p>$5sq = 60 \text{ min}$ $1sq = (60 \div 5) \text{ min}$ = 12 min (c). $= 7 \text{ km}$</p> <p><i>y-axis</i> $5sq = 5 \text{ km}$ $1sq = 1 \text{ km}$</p>																																

SUMMARY OF FORMULAS

1 RECTANGLE $A = L \times W$ Therefore $L = \frac{A}{W}$ and $W = \frac{A}{L}$ $P = L + W + L + W$ or $2(L + W)$	2 SQUARE $A = S \times S$ or S^2 Therefore $S = \sqrt{A}$ $P = S + S + S + S$ or $4S$ Therefore $S = \frac{P}{4}$	3 TRIANGLE $A = \frac{b \times h}{2}$ Therefore $b = \frac{2A}{h}$ and $h = \frac{2A}{b}$ $P = b + h + H$ ($S + S + S$)
4 RHOMBUS $A = \frac{D_1 \times D_2}{2}$ $P = S + S + S + S$ or $4S$	5 TRAPEZIUM $A = \frac{h(a + b)}{2}$ $P =$ (sum of the length of all the four sides)	6 PARALLELOGRAM $A = b \times h$ $P =$ (lengths' sum of 4 sides)
7 CIRCLE $A = \pi r^2$ Therefore $r = \sqrt{\frac{A}{\pi}}$ $C = 2\pi r$ or πD Therefore $D = \frac{C}{\pi}$ or $r = \frac{C}{2\pi}$	8 SEMI-CIRCLE $A = \frac{1}{2} \pi r^2$ $C = \frac{1}{2} \pi D$ $P = \frac{1}{2} \pi D + D$	9 QUADRANT $A = \frac{1}{4} \pi r^2$ $C = \frac{1}{4} \pi D$ $P = \frac{1}{4} \pi D + D$
10 REGULAR PENTAGON $P = S + S + S + S + S$ or $5S$ $A = \frac{A \times P}{2}$	11 PYTHOGORAS THEOREM $H = \sqrt{b^2 + h^2}$ Therefore $b = \sqrt{H^2 - h^2}$ $h = \sqrt{H^2 - b^2}$	12 ALGEBRA $AB = A \times B$ $2A = 2 \times A (A + A)$ $\frac{A}{B} = A \div B (A : B)$
13 CUBE Sum of edges = 12S Therefore S $= \frac{\text{Sum of edges}}{12}$ $B.A = S \times S$ (lateral surface) $V = S \times S \times S$ or S^3 Therefore $S = \sqrt[3]{V}$ $TSA = 6S^2$ Therefore $S = \sqrt{\frac{TSA}{6}}$	14 CUBOID Sum of edges = $4L + 4W + 4H$ $B.A = L \times W$ $V = B.A \times H$ $V = L \times W \times H$ $TSA = 2(LW + LH + WH)$	15 CYLINDER $B.A = \pi r^2$ Note: Base Area is the same as cross section area (Area of shape that forms the base) $V = B.A \times h$ $V = \pi r^2 \times h$ ($\pi r^2 h$) $C.A = 2\pi rh$ $TSA = 2\pi r^2 + 2\pi rh$ or $TSA = 2\pi(r^2 + rh)$

<p>16 CONE</p> $V = \frac{1}{3} \pi r^2 h$ $B.A = \pi r^2$ $C.S.A = \pi r l$ $TSA = \pi r^2 + \pi r l$ $(l - \text{slanting side})$	<p>17 SPHERE (FOOTBALL)</p> $V = \frac{4}{3} \pi r^3$ $TSA = 4\pi r^2$	<p>18 HEMISPHERE-HALF SPHERE</p> $V = \frac{1}{2} \text{ of } \frac{4}{3} \pi r^3 = \frac{2}{3} \pi r^3$																											
<p>19 TRIANGULAR PRISM</p> $B.A = \frac{b \times h}{2} \text{ (C.S.A)}$ $V = \frac{b \times h}{2} \times L$ $TSA = (b \times h) + L(b + h + H)$ $(C.S.A - \text{cross section area})$	<p>20 TRAPEZIUM PRISM</p> $B.A = \frac{h(a + b)}{2} \text{ (C.S.A)}$ $V = \frac{h(a + b)}{2} \times L$ $TSA = h(a + b) + L(h + a + H + b)$	<p>21 SQUARE BASED PYRAMID</p> $B.A = S^2 (S \times S)$ $V = \frac{1}{3} \times S^2 \times h$																											
<p>22 INTEREST</p> $I = \frac{P \times TR}{100}$ <p>Therefore $P = \frac{I \times 100}{T \times R}$</p> $R = \frac{I \times 100}{T \times P}$ $T = \frac{I \times 100}{P \times R}$ $A = P + I$ <p>Therefore $P = A - I$</p> $I = A - P$	<p>23 PROFIT & LOSS</p> $P = S.P - C.P$ <p>Therefore $S.P = P + C.P$</p> $C.P = S.P - P$ $\%P = \frac{P}{C.P} \times 100$ $L = C.P - S.P$ <p>Therefore $C.P = L + S.P$</p> $S.P = C.P - L$ $\%L = \frac{L}{C.P} \times 100$	<p>24 STATISTICS</p> <p><u>Mean/Average</u> – refers to the sum of items divide by number of items.</p> <p><u>Median</u> – Middle number after arranging either in ascending or descending order. In case there are two numbers in the middle, find their average.</p> <p><u>Mode</u> – the number with highest frequency.</p> <p><u>Modal frequency</u> – how many times the mode number appears.</p> <p><u>Range/scope</u> – the difference between the highest and lowest</p>																											
<p>25 TABLES</p> <p><u>Area & land surface</u></p> <table border="1"> <tr> <td>hm^2</td> <td>dam^2</td> <td>m^2</td> </tr> <tr> <td>ha</td> <td>a</td> <td>ca</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> </table> <p><u>Volume of heaps</u></p> <table border="1"> <tr> <td>m^3</td> <td>dm^3</td> </tr> <tr> <td>$dast$</td> <td>st</td> </tr> <tr> <td>1</td> <td>0</td> </tr> </table> <p><u>Vol. Cap & Mass of water</u></p> <table border="1"> <tr> <td>m^3</td> <td>dm^3</td> <td>cm^3</td> </tr> <tr> <td>kl</td> <td>hl</td> <td>dal</td> </tr> <tr> <td>t</td> <td>q</td> <td>–</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> </table>	hm^2	dam^2	m^2	ha	a	ca	1	0	0	m^3	dm^3	$dast$	st	1	0	m^3	dm^3	cm^3	kl	hl	dal	t	q	–	1	0	0	<p>26 INTERVALS</p> <p>Open interval</p> $Ni = Np - 1$ $D = Ni \times Li$ <p>Therefore $Np = \left(\frac{D}{Li}\right) + 1$</p> <p>Closed interval</p> $Ni = Np$ <p>Distance</p> $D = Li \times Ni$	<p>27 ANGLES</p> <p><u>Opposite angles(equal)</u></p> $a = c, e = g, h = f, d = b$ <p><u>Corr. angles (equal)</u></p> $a = e, d = h, b = f, c = g$ <p><u>Alt. angles (equal)</u></p> $e = c, f = d$ <p><u>Co – int. (sum upto 180°)</u></p> $(e and d), (f and c)$ <p><u>Co – ext. (sum upto 180°)</u></p> $(h and a), (g and b)$
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