UGANDA NATIONAL EXAMINATIONS BOARD

PRIMARY LEAVING EXAMINATION

2020

MATHEMATICS

Time Allowed: 2 hours 30 minutes

Random No.						Personal No.		

Candidate's Name: MUWANIKA BRIAN .....

Candidate's Signature: .....

District ID No. 0 0 2 6

Read the following instructions carefully:

1. Do not write your **school** or **district name** anywhere on this paper.

2. This paper has **two** sections: A and B.
Section **A** has **20** questions and section **B** has **12** questions. The paper has **15 printed pages.**

3. Answer **all** questions. **All** the working for both sections **A** and **B** must be shown in the spaces provides.

4. **All** working **must** be done using a **blue** or **black** ball point pen or ink. Any work done in pencils other than graphs and diagrams will **not** be marked.

5. **No calculators** are allowed in the examination room.

6. Unnecessary **changes** in your work and handwriting that cannot be read easily may lead to **loss of marks**.

7. Do not fill anything in the table indicated:
"For Examiners' use only" and boxes inside the question paper.

FOR EXAMINERS' USE ONLY		
Qn. No.	**MARKS**	**EXR'S NO.**
1 - 5		
6 - 10		
11 - 15		
16 - 20		
21 - 22		
23 - 24		
25 - 26		
27 - 28		
29 - 30		
31 - 32		
TOTAL		

SECTION A: 40 MARKS

*Answer **all** the questions in this section*

*Questions **1** to **20** carry two marks each*

1. Work out: 473 + 312

Topic: Operation on whole numbers		OR	And many more Other approaches	
H T O 4 7 3 + 3 1 2 7 8 5	4 7 3 +3 1 2 7 8 5	400 + 70 + 3 + 300 + 10 + 2 700 + 80 + 5		*.Using an abacus* *To mention a few*

2. Write 27,040 in words.

Topic: Whole numbers		OR	And many more Other approaches
27,000	Twenty - seven thousand		
+ 40	Forty		
27, 040	Twenty - seven thousand, forty.		

THOUSANDS			UNITS		
H	T	O	H	T	O
	2	7	0	4	O

Twenty - seven thousand, forty

3. Circle all the triangular numbers in the list below.

4, 5, 6, 7, 8, 9, 10.

Topic: Patterns and Sequence	OR	And many more Other approaches
1 4, 5, (6), 7, 8, 9, (10). 1+2 = 3 1+2+3 = 6 1+2+3+4 = 10 1+2+3+4+5 = 15		4, 5, (6), 7, 8, 9, (10). 1, 3, 6, 10, 15, 21 ... 1, 1+2, 1+2+3, 1+2+3+4, ... 1, 3, 6, 10, ...

4 .Given that the subsets of set Q are; {m}, {k}, {m, k}, { }, find n(Q)

Topic: Sets	OR	And many more Other approaches

$Q = \{m,k\}$

$n(Q) = 2$

Set Q has 4 subsets

2^n = Number of subsets

$4 \div 2 = 2$

$2 \div 2 = 1$

$2^n = 2^2$

$n = 2$

$n(Q) = 2$

5. Write 5834 in standard form.

Topic: Operation on whole numbers	OR	And many more Other approaches

$5834 \div 10 = 583.4$ 1^{st}

$583.4 \div 10 = 58.34$ 2^{nd}

$58.34 \div 10 = 5.834$ 3^{rd}

$5834 = 5.834 \times 10^3$

5	8	3	4
10^3	10^2	10^1	10^0

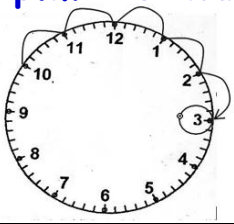
$5834 = 5.834 \times 10^3$

6. A taxi left Kampala for Gulu at 10:00p.m. The journey took 5hours.What time did the taxi arrive in Gulu?

Topic: Time	OR	And many more Other approaches

Arrival time = Departure time + Duration

Arrival time = 10:00p.m + 5 hours

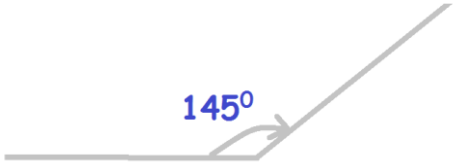
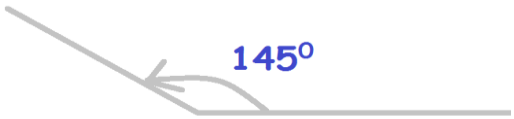


At 3:00 am

Hours	Minutes
10	00 pm
+ 5	00
15	00

15:00 -12:00 = 3:00 am

7. Using a protractor and a ruler, draw an angle of 145^0

Topic: Construction	OR *And many more Other approaches*
	

8. Given that m = 5, n = 3 and r = $^-2$, find the value of $\frac{mn}{n-r}$

Topic: Algebra	OR	*And many more Other approaches*
$\frac{m \times n}{n - r}$ $= \frac{5 \times 3}{3 - (^-2)}$ $- \times - = +$ $= \frac{5 \times 3}{3 + 2}$ $= \frac{15}{5}$ $= 3$		

9. Change 9.85 kilogrammes into grammes.

Topic: Length mass and capacity	OR	*And many more Other approaches*
1kg = 1000g 9.85kg = 9.85 x 1000g $= \frac{985}{100} \times 1000g$ $= \frac{9851000g}{100}$ $= 98510g$		

10. A box contains 5 blue pens and 6 red pens. A pen is picked at random from the box. Find the probability that the pen picked is blue.

Topic: Whole numbers	OR	*And many more Other approaches*
$\text{Probability} = \frac{\text{Number of events}}{\text{Number of sample space}}$ $= \frac{5}{(5+6)}$ $= \frac{5}{11}$		Number of events = 5 Number of sample space = 11

11. Solve: $3Y = 5$ (finite 7)

Topic: Integers	OR	*And many more Other approaches*
$3y = 5(\text{finite } 7)$ $5(\text{finite } 7) = 5, 12, 17\ldots$ $\frac{3y}{3} = \frac{12}{3}(\text{finite } 7)$ $y = 4(\text{finite } 7)$		$3y = 5(\text{finite } 7)$ $3y = 5+7(\text{finite } 7)$ $\frac{3y}{3} = \frac{12}{3}(\text{finite } 7)$ $y = 4(\text{finite } 7)$

12. Find the lowest common multiple (LCM)of 18 and 30.

Topic: Patterns and sequence	OR	*And many more Other approaches*
M18 = {18,36,54,90…} M30 = {30,60,90…} LCM = 90		2 | 18 | 30 3 | 9 | 15 3 | 3 | 5 5 | 1 | 5 1 | 1 LCM = 2x3x3x5 LCM = 90

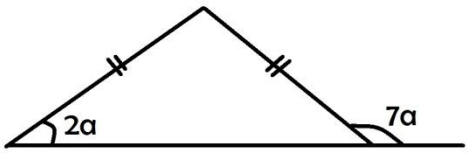
13. Work out: 9.8 ÷ 0.07

Topic: Fractions	OR	And many more Other approaches
$9.8 \div 0.07$ $= \frac{98}{10} \div \frac{7}{100}$ $= \frac{98}{10} \times \frac{100}{7}$ $= 14 \times 10$ $= 140$	$9.8 \div 0.07$ $= \frac{9.8}{0.07}$ $= \frac{9.8 \times 100}{0.07 \times 100}$ $= \frac{980}{7}$ $= 140$	$9.8 \div 0.07$ $= (98 \times 10^{-1}) \div (7 \times 10^{-2})$ $= (98 \div 7) \times (10^{-1} \div 10^{-2})$ $= 14 \times (10^{-1-(-2)})$ $= 14 \times (10^{-1+2})$ $= 14 \times 10^{1}$ $= 14 \times 10$ $= 140$

14. Auma sold two cocks for sh 70,000 making a profit of sh12000. If both cocks cost the same price, find the price Auma bought each cock.

Topic: Fractions	OR	And many more Other approaches
Buying price of the two cocks sh 70,000 - sh 12,000sh 58,000 Buying price of one cock sh $\frac{58,000}{2}$ = sh 29000	Selling price of each cock sh $\frac{70000}{2}$ = sh 35000 Profit made on each cock sh $\frac{12000}{2}$ = sh 6000 Buying price of each cock sh 35000 – sh 6000 = sh 29000	

15. Find the value of a in degrees in the diagram below.



Topic: Construction	OR	And many more Other approaches
$2a + 7a = 180°$ $9a = 180°$ $\frac{9a}{9} = \frac{180°}{9}$ $a = 20°$		➢ *Two base angles of an isosceles triangle are equal.* ➢ *Angles on a straight line , add upto 180^0*

16. The ratio of male workers to female workers in a factory is 2:3. There are 30 male workers in the factory. Find the total number of workers in the factory.

Topic: Fractions	OR	And many more Other approaches
Total ratio $2+3 = 5$ $= 30 \div \frac{2}{5}$ $= 30 \times \frac{5}{2}$ $= 15 \times 5$ $= 75$ workers		*Let the total number ofworkers be n* $\frac{2}{5} \times n = 30$ $\frac{2n}{5} = 30$ $5 \times 2n = 30 \times 55$ $\frac{2n}{2} = \frac{150}{2}$ $n = 75$ workers

17. Solve: $\frac{5}{6}k - 7 = 3$

Topic: Algebra	OR	*And many more Other approaches*
$\frac{5k}{6} - 7 = 3$ $\frac{5k}{6} - 7+7 = 3+7$ $\frac{5k}{6} = 10$ $\frac{6x5k}{6} = 10x6$ $\frac{5k}{5} = \frac{60}{5}$ $k = 12$		$\frac{5k}{6} - 7 = 3$ $\frac{(6x5k)}{6} - (7x6) = (3x6)$ $5k - 42 = 18$ $5k - 42 + 42 = 18+42$ $\frac{5k}{5} = \frac{60}{5}$ $k = 12$

18. Find the mean of the following: 4, 7, 8, 5.

Topic: Data handling	OR	*And many more Other approaches*
Mean $= \frac{\text{Sum of data}}{\text{number of items}}$		Mean $= \frac{4+7+8+5}{4}$ Mean $= \frac{24}{4}$ Mean $= 6$

19. The diameter of a bicycle wheel is 70 cm. Find the distance it covers in two complete revolutions. (Use $\pi = \frac{22}{7}$)

Topic: Length mass and capacity	OR	*And many more Other approaches*
Distance covered in onerevolution $= \pi d$ $= \pi x d$ $= \frac{22}{7} x 70cm$ $= 22x10cm$ $= 220cm$ In two revolutions $220cm x 2$ $= 440cm$		$= 2x circumference$ $= 2x\pi xd$ $= 2x \frac{22}{7} x 70cm$ $= 2x22x10cm$ $= 2x220cm$ $= 440cm$

20. An aero plane flying at an average speed of 260 km/h from airport *E* to airport *N* took 45 minutes. Calculate the distance between the two airports

Topic: Measures S/D/T	OR	*And many more Other approaches*
$S=260km/h, T=45mins$ $D = SxT$ $D = 260km/h \times \frac{45h}{60}$ $D = \frac{260km}{1h} \times \frac{45h}{60}$ $D = 13km \times 15$ $D = 195km$		Time $T = \frac{45h}{60}$ $T = \frac{3h}{4}$ Distance $D = 260km/h \times \frac{3h}{4}$ $D = \frac{260km}{1h} \times \frac{3h}{4}$ $D = 65km \times 3$ $D = 195km$

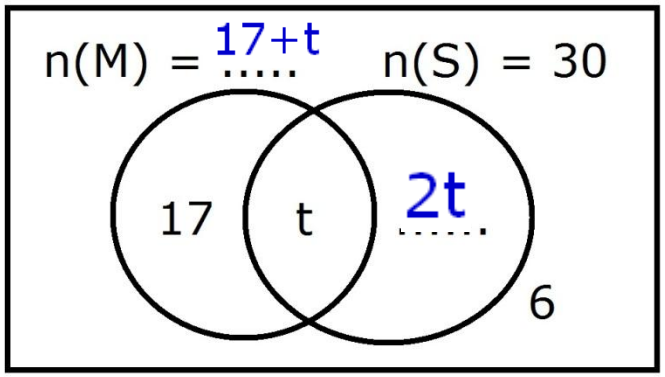
SECTION B: 60 MARKS

Answer all the questions in this section

Marks for each question are indicated in brackets

21. In a class party, two types of drinks were served, soda (s) and mineral water (m). 30 pupils took soda and t pupils took both soda and mineral water. 6 pupils took neither of the drinks while 17 pupils took only mineral water. The number of pupils who took soda only was twice that of those who took both soda and mineral water.

(a) Use the given information to complete the Venn diagram below. **(02 marks)**



(b) Find the number of pupils who took both drinks. **(02 marks)**

Topic: Sets	OR	*And many more Other approaches*
$t+2t = 30$ $\frac{3t}{3} = \frac{30}{3}$ $t = 10$ 10 pupils	Both : n(S)only 1 : 2 Total ratio 1+2 = 3 $\frac{1}{3} \times 30$ 1 x 10 10 pupils	$2t = 30 - t$ $2t+t = 30 - t+t$ $3t = 30$ $\frac{3t}{3} = \frac{30}{3}$ $t = 10$ 10 pupils

(c) Calculate the total number of pupils in the class. (02 marks)

Topic: Sets	OR	And many more Other approaches
$=17+t+2t+6$ $= 17+6+3t$ $= 23 + (3xt)$ $= 23 + (3x10)$ $= 23 + 30$ $= 53$ pupils	$= 10+(2x10)+17+6$ $= 10+20+23$ $= 53$ pupils	*Let the total be n* $(17+t+30+6)-n = t$ $(17+10+36)-n = 10$ $63 - n = 10$ $63 - 63 - n = 10 - 63$ $\frac{-n}{-1} = \frac{-53}{-1}$ $n = 53$ 53 pupils

22. Convert 103_{five} to base two.

Topic: Whole numbers	OR	And many more Other approaches

103_{five}

ones

fives

five fives

$(1x5x5) + (0x5) +(3x1)$

$= 25 + 0 + 3$

$= 28_{ten}$

28_{ten} to base two

Base	Number	Remainder
2	28	
2	14	0
2	7	0
2	3	1
2	1	1
	0	1

11100_{two}

$103_{five} = 11100_{two}$

23. The list below show prices of different items in a certain shop.

- **2 kg of sugar costs sh 6, 800**
- **500g of posho cost sh 1,600**
- **1 kg of beans costs 3,000**
- **3 bars of soap cost sh 10,500**

(a) How much money will Opio pay for 3 kg of sugar?

Topic: Fractions- Money	OR	*And many more Other approaches*
$\text{sh } \frac{6800}{2} \times 3$ sh 3400 x 3 sh 10200		$\frac{3}{2} \times \text{sh } 6800$ sh 3400 x 3 sh 10200

(b) Nakitto buys 1 kg of beans, $1\frac{1}{2}$ kg of posho and 3 bars of soap. How much does she pay?

Topic: Fractions-Money	OR	*And many more Other approaches*
Posho $(\text{sh } 1600 \div \frac{500}{1000}) \times 1\frac{1}{2}$ $\text{sh } 1600 \times \frac{1000}{500} \times \frac{3}{2}$ = sh 1600 x 3 = sh 4800 Amount paid sh 10500 sh 4800 + sh 3000 sh 18300		$1\frac{1}{2}$kg of posho cost $1\frac{1}{2} \times \text{sh } 3200$ $\frac{3}{2} \times \text{sh } 3200$ 3 x sh 1600 sh 4800 Amount paid sh 10500 sh 4800 + sh 3000 sh 18300

24. Kapere deposited sh 750,000 in a bank. The bank offers a simple interest at a rate of 18% per year. After some time, Kapere had an amount of sh 885,000 in the bank.

(a) Find the interest Kapere earned.

Topic: Fractions-Percentages	OR	*And many more Other approaches*
$SI = A - P$ sh 885000 - sh 750000 sh 135000		$P+I = A$ sh 75000 + SI = sh 885000 SI = sh 885000 – sh 75000 SI = sh 135000

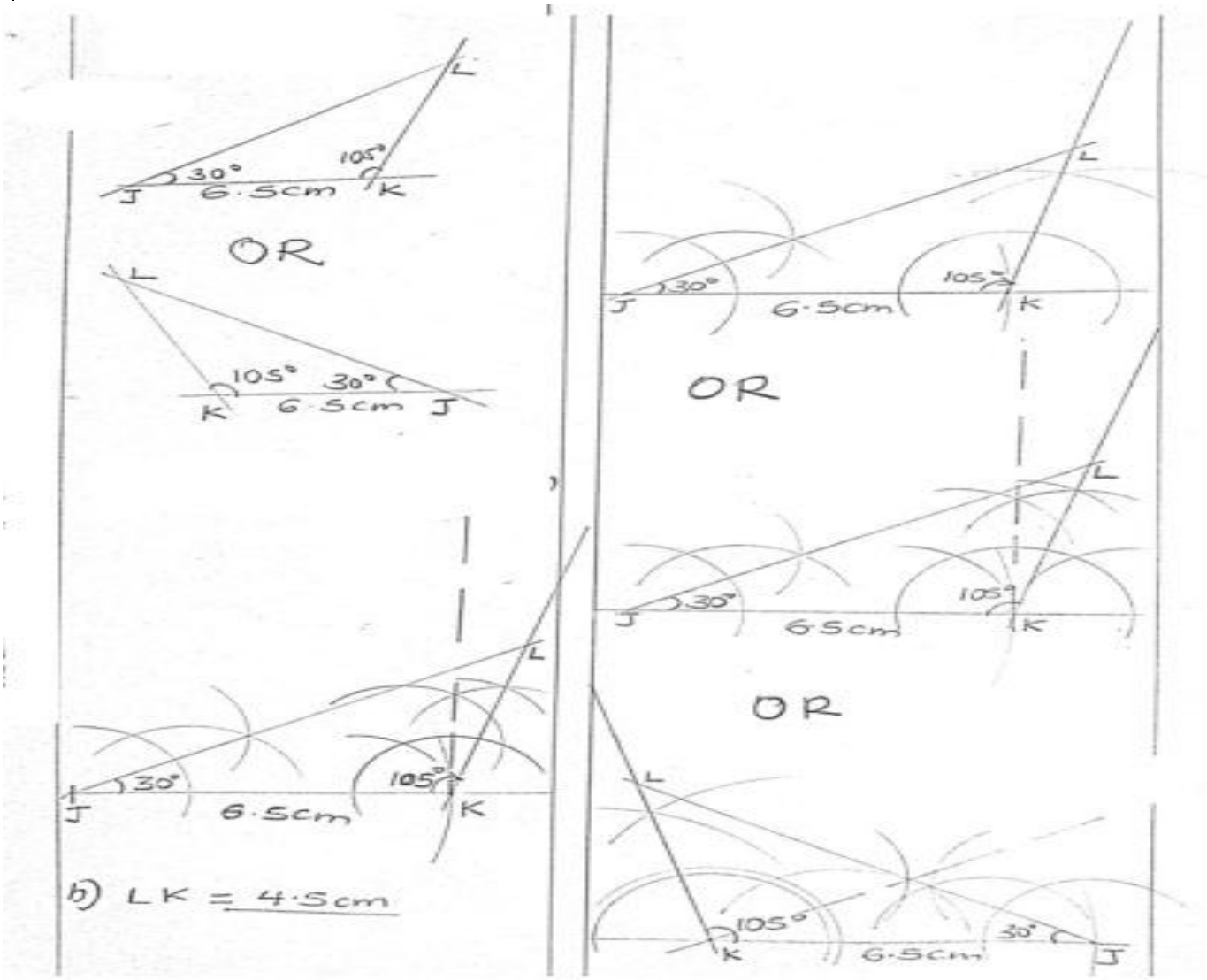
(b) Calculate how long the money was in the bank.

Topic: Fractions-Percentages	OR	*And many more Other approaches*
$T = \frac{SI \times 100}{PXR}$ $T = \frac{\text{sh } 135000 \times 100}{\text{sh } 75000 \times 18}$ $T = \frac{15 \times 5}{75}$ T = 1 year		PxRxT = SI sh 135000x18%xT = sh 75000 $\text{sh } \frac{135000x18xT}{100} = \text{sh } 75000$ sh 1350x18xT = sh 75000 $\frac{\text{sh } 75000xT}{\text{sh } 75000} = \frac{\text{sh } 75000}{\text{sh } 75000}$ T = 1year

25. Using a ruler and a pair of compasses only,

(a) Construct triangle JKL where JK = 6.5 cm, angle LJK = 30^0 and angle JKL = 105^0.

Topic: Construction	*And many more Other approaches*

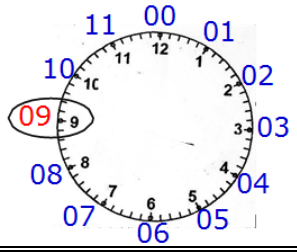


(b) Measure the length LK. 4.5 cm

26. The time table below shows the journey of a bus from Mbale to Kampala through Tororo, Bugiri, Iganga and Jinja. Study the table and use it to answer the questions that follow.

Town	Arrival time	Departure time
Mbale		09 00 hours
Tororo	09 30 hours	09 45 hours
Bugiri	10 25 hours	10 30 hours
Iganga	11 50 hours	12 00 hours
Jinja	13 30 hours	13 40 hours
Kampala	14 30 hours	

(a) Convert the arrival time of the bus at Tororo into 12 hour clock.

Topic: Time	OR	*And many more Other approaches*
09 30 - 00 00 9:30 a.m		

(b) How long did the bus take to travel from Jinja to Kampala?

Topic: Time	OR	*And many more Other approaches*
Hours Minutes 14 30 /30+60 - 13 40 / 90 - 40 0 50 50 minutes		

(c) The distance from Mbale to Kampala is 275 km. Calculate the average speed of the bus for the whole journey.

Topic: Measures-S/D/T	OR	*And many more Other approaches*

Hours	Minutes
14	30
- 09	00
5	30

5 hours 30 minutes

$T = 5\frac{1}{2}$ hours

D = 275 km

$S = D \div T$

$S = 275\text{ km} \div 5\frac{1}{2}\text{h}$

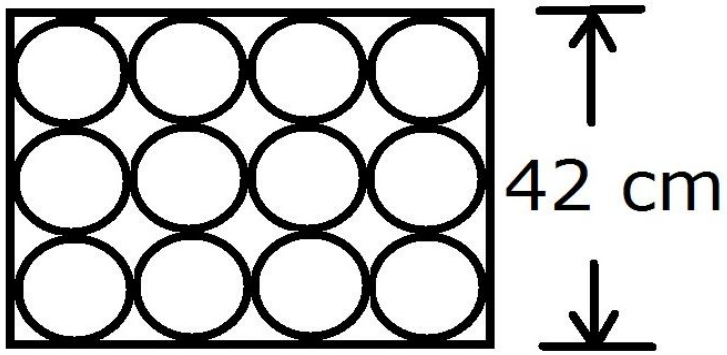
$S = 275\text{ km} \div \frac{11}{2}\text{h}$

$S = 275\text{ km} \times \frac{2}{11\text{h}}$

S = 50km/h

10

27. Lukwago cut circular cards from a rectangular manila paper whose width is 42 cm as shown in the diagram below. Study the diagram and answer the questions that follow.



(a) Find the length of the manila paper.

Topic: Length Mass and Capacity	OR	*And many more Other approaches*
42cm ÷ 3 = 14cm 14cm x 4 = 56cm		$\frac{4}{3}$ x 42cm 4 x 14cm =56cm

(b) Calculate the area of the pieces of the manila paper that remained. (Use $\pi = \frac{22}{7}$)

Topic: Length Mass and Capacity	OR	*And many more Other approaches*
Manilla A = LxW A = 56cm x 42cm A = 2352cm²	Cards A = πr² x 12 A = π x r x r x 12 A = $\frac{22}{7}$x$\frac{14}{2}$cmx$\frac{14}{2}$cmx12 A = 1848cm²	Remaining area 2352cm² – 1848cm² =504cm²

28. In a school, the fraction of boys is $\frac{1}{5}$ more than that of girls. The school has 280 girls.

(a) Find the fraction of girls in the school.

Topic: Fractions	OR	*And many more Other approaches*
If girls = n boys = $n + \frac{1}{5}$ Value of n $n + n + \frac{1}{5} = 1$ $2n + \frac{1}{5} = 1$ $\frac{(5x2n) + (5x1)}{5} = (1x5)$ $10n + 1 = 5$ $10n + 1 - 1 = 5 - 1$ $\frac{10n}{10} = \frac{4}{10}$ $n = \frac{2}{5}$ Girls = $\frac{2}{5}$		

(b) Calculate the total number of pupils in the school.

Topic: Fractions	OR	*And many more Other approaches*
Let the total number of pupils be n $\frac{2}{5}$ of n = 280 $\frac{2}{5} \times n = 280$ $\frac{2n}{5} = 280$ $\frac{5x2n}{5} = 280x5$ $2n = 280 \times 5$ $\frac{2n}{2} = \frac{280x5}{2}$ $n = 140x5$ n = 700 pupils		$\frac{2}{5}$ = <table><tr><td>2</td><td>5</td></tr><tr><td>280</td><td>??</td></tr></table> $\frac{5}{2} \times 280$ $= 5 \times 140$ = 700 pupils

29. The interior angle sum of a regular polygon is 1800^0.

(a) Calculate the number of sides of the polygon.

Topic: Construction	OR	*And many more Other approaches*
$180^0(n-2) = \text{Int.} < \text{sum}$ $180°(n-2) = 1800°$ $\frac{180°(n-2)}{180°} = \frac{1800°}{180°}$ $n - 2 = 10$ $n-2+2 = 10 + 2$ $n = 12$ $= 12$ sides		$180°(n-2) = 1800°$ $180°n - 360° = 1800°$ $180°n = 1800°+360°$ $180°n = 2160°$ $\frac{180°n}{180°} = \frac{2160°}{180°}$ $n = 12$ sides

(b) Find the size of each exterior angle of the polygon.

Topic: Construction	OR	*And many more other approaches*
Each interior angle $1800° \div 12 = 150°$ Each exterior angle $180° - 150° = 30°$		$= \frac{360°}{\text{Number of Sides}}$ $= \frac{360°}{12}$ $= 30°$

30. A water tank with capacity of 4,800 litres was $\frac{3}{4}$ full. Some of the water was sold using 20 litre jerrycans at sh 200 each. After selling the water, $\frac{1}{6}$ of it remained.

(a) Find in litres, the amount of water which was sold.

Topic: Length mass capacity	OR	*And many more other approaches*
Fraction sold $= \frac{3}{4} - \frac{1}{6}$ of $\frac{3}{4}$ $= \frac{3}{4} - \frac{1}{6} \times \frac{3}{4}$ $= \frac{3}{4} - \frac{1}{8}$ $= \frac{6-1}{8}$ $= \frac{5}{8}$ Amount of water sold $= \frac{5}{8} \times 4800$ $= 5 \times 600$ $= 3000$ litres	$\frac{6}{6} - \frac{1}{6}$ $\frac{6-1}{6}$ $\frac{5}{6}$ Amount of water sold $\frac{5}{6}$ of $(\frac{3}{4} \times 4800)$ litres $\frac{5}{6}$ of (3×1200) litres $\frac{5}{6} \times 3600$ litres $= 5 \times 600$ litres **= 3000 litres**	

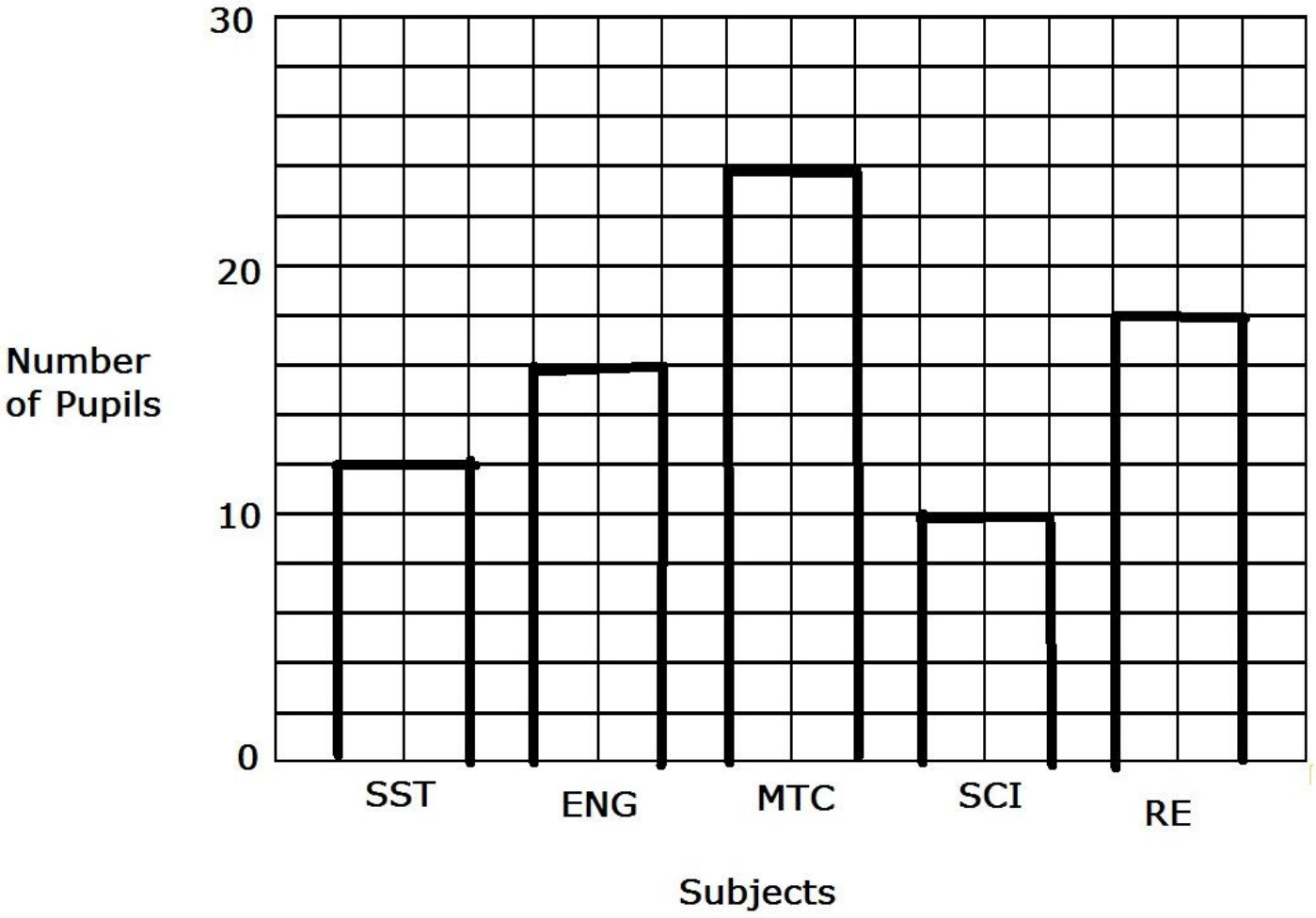
(b) Calculate the amount of money earned from the sale of the water.

Topic: L/M/C -Fraction=proportions	OR	*And many more other approaches*
Number of jerrycans $= \frac{3000}{20}$ = 150 jerrycans Amount of money = 150 x sh 200 = sh 30000		

31. A book costs three times as much as a pencil. A pen costs sh 300 more than a pencil. If a book costs as much as a pen and a pencil, find the cost of a book.

Topic: Algebra	OR	*And many more other approaches*
Let the cost of a pencil be *p* Book --- *3p* Pen --- *p + sh 300* Value of p 3p = p + p + sh 300 3p = 2p + sh 300 3p-2p= 2p – 2p + sh 300 p = sh 300 Cost of a book =3p = 3xp = 3xsh 300 = sh 900		

32. The bar graph below shows the number of pupils in a class and their best liked subjects. Study the graph and use it to answer the questions that follow.



(a) Which subject is liked by fewer pupils?

Topic: Data handling	OR	*And many more other approaches*
Science		

(b) How many pupils liked Mathematics best?

Topic: Data handling	OR	*And many more other approaches*
Vertical scale $\frac{10}{5} = 2$ *1sq rep 2pupils* =(2x12) pupils 24 pupils		

(c) Calculate the total number of pupils in the class.

Topic: Data handling	OR	*And many more other approaches*
=40x2 = 80 pupils OR $\frac{40 \times 10}{5}$ = 8 x 10 = 80 pupils		SST --- (6x2) = 12 ENG --- (8x2) = 16 MTC --- (12x2)=24 SCI --- (5x2) = 10 RE --- (9x2) = 18 Total =12+16+24+10+18 =80 pupils

(d) Find the percentage of pupils who liked English best.

Topic: Data handling	OR	*And many more other approaches*
$= \frac{8}{40} \times 100\%$ = 2 x 10% = 20%		$\frac{8}{40} \rightarrow \frac{1}{5}$ As a percentage =1x20 = 5x20 = 20 = 100 = 20%

Note: the arrangement of steps is not that standard due to Little space provided.

There are also more alternatives of approaching each of the questions.

A few are listed however.

Teachers reminder: help learners with original compressional and application questions in order to enable them understand Maths the way you do it or else it's true you delivery the knowledge to them but there is need of effective evaluation to them and assistance.

Any school or individual who needs to get Mathematical diagrams which most of the time disturb our secretaries

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Every two weeks a set piece of Original topical paper will be out for trial and you will receive it through whatsapp.