UGANDA NATIONAL EXAMINATIONS BOARD

PRIMARY LEAVING EXAMINATION

2024

MATHEMATICS

Time Allowed: 2 hours 30 minutes

Random No.						Personal No.		

Candidate's Name: P.L.E MARKING GUIDE PREPARED BY TR: SIMON PETER O

Candidate's Signature: Tel 0701712426, 0777560161

District ID No.

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** the questions. **All** the working for both sections **A** and **B** must be shown in the spaces provided.
4. **All** the working **must** be done using a **blue** or **black** ball point pen or ink. Any work done in pencil 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 in the 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.*

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1. Work out:

Note: operation sign has no place value.

$$\begin{array}{r} {\scriptstyle 1} \\ 3\ 5 \\ \times\ \textcircled{x}\ 3 \\ \hline 1\ 0\ 5 \end{array}$$

$5 \times 3 = 15$

$(3 \times 3) + 1 = 9 + 1$

$= 10$

2. Write CXIV in Hindu Arabic numerals.

C ——— 100
X ——— 10
IV ——— 4
CXIV = 114

$\therefore$ CXIV = 114

3. Given that M = {b, a, t}, write down all the subsets of set M.

subsets of set M = { }, {b}, {a}, {t}, {b,a}, {b,t}, {a,t}, {b,a,t}

4. Find a fraction equivalent to $\frac{4}{7}$.

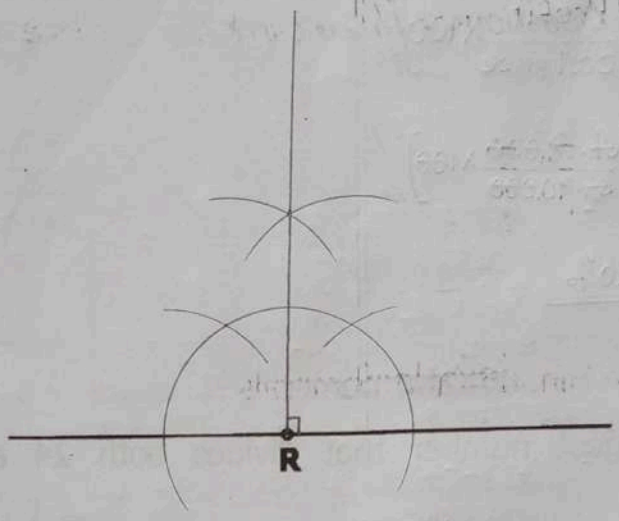
$$\frac{4}{7} = \frac{4 \times 2}{7 \times 2} = \frac{8}{14}$$

5. Expand 3405 using powers of ten.

$= 3,4^{2}0^{1}5^{0}$

$= (3 \times 10^{3}) + (4 \times 10^{2}) + (0 \times 10^{1}) + (5 \times 10^{0})$

6. Using a ruler and a pair of compasses only, construct a right angle at point **R**.



7. Given that $a = 3$, $b = 1$ and $n = 2$, find the value of $2a^n b$.

$2a^n b = 2 \times 3^2 \times 1$

$= (2 \times 3) \times (3 \times 1)$

$= 6 \times 3$

$= 18$

8. Find the next number in the sequence:

2, 3, 6, 11, 18, ... 27

+1 +3 +5 +7 +9

9. It takes Ankunda 35 minutes to walk from school to home. If she arrived home at 12:20 p.m, what time did she leave school?

Departure time = Arrival time − Duration

	Hours		Minutes
	~~12~~ 11	:	~~20~~ 10
−	00	:	35
	11	:	45 am

∴ she left school at 11:45 am

10. Otunu sold a goat and made a profit of sh 18,000. The cost price of the goat was sh 90,000. Calculate Otunu's percentage profit.

Percentage Profit $= \left(\frac{\text{Profit}}{\text{cost price}} \times 100\right)\%$

$= \left(\frac{\text{sh. } 18{,}000}{\text{sh. } 90{,}000} \times 100\right)\%$

$= 20\%$

11. Find the largest number that divides both 24 and 18 without a remainder.

	24	18
√2	12	9
2	6	9
2	3	9
√3	3	3
3	1	1
	1	

The largest number

$= 2 \times 3$

$= 6$

12. Work out: $42 - 21 \div 3$

Using BODMAS

$42 - 21 \div 3 = 42 - (21 \div 3)$

$= 42 - 7$

$= 35$

Note: You can also use PEMDAS as one of the basic principle which is very crucial in number operation.

13. The range of a set of scores is 23. The highest score is 76. Find the lowest score.

Range = Highest Value − Lowest Value

let W be the lowest value

$76 - W = 23$

$76 - 76 - W = 23 - 76$

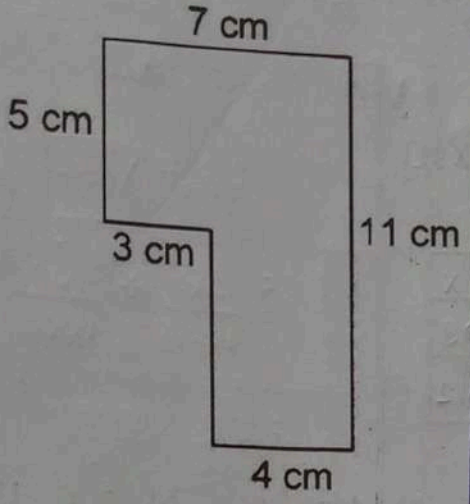
$-W = -53$

$+W = +53$

$+1 \qquad +1$

$\therefore W = 53$ hence the lowest score.

14. Find the perimeter of the figure below.



7cm
5cm
3cm
11cm
(11-5)cm
= 6cm
4 cm

Perimeter = S+S+S+S+S+S

= (4 + 6) + (3 + 5) + (7 + 11) cm

= (10 + 8) + 18) cm

= [18 + 18) cm

= 36cm

15. A school cook requires 24 kg of maize flour to feed 120 pupils. Find in grammes, the amount of maize flour the cook would require to feed 3 pupils.

in grammes.

Total weight of maize flour

Kg	Hg	Dg	G	dg	Cg	Mg
1	0	0	0			

1Kg ——— 1000g

24Kg ——— [24 × 1000)g

= 24,000g

120pupils consume 24,000g

1pupil consumes $\frac{24,000g}{120}$

1pupil consumes 200grammes

3pupils consume (3×200)g

= 600 grammes

∴ the cook would require 600grammes of maize flour to 3pupils.

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16. Akiiki bought a suit at Kenya shillings (Ksh) 11,500. If the exchange rate was 1 Ksh = Ug.sh 32, how much money would Akiiki have paid for the suit in Uganda shillings (Ug.sh)?

1 Ksh. ——— Ugsh. 32.

Ksh. 11,500 ——— ugsh. (11,500 × 32)

=

	1	1	5	0	0	×
0	0	1	0	0		
3	3	5	0	0	3	
0	0	1	0	0		
3	2	2	0	0	0	2

6 8 0 0 0

= Ug. sh. 368,000

17. Solve: $3 - 2y < 9$

$3 - 2y < 9$

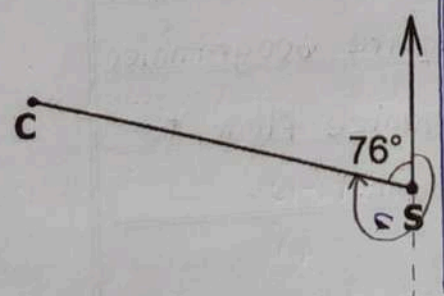
$= 3 - 3 - 2y < 9 - 3$

$= -2y < 6$

$= \frac{+2y}{+2} > \frac{6}{-2}$

$\therefore y > -3$

18. The diagram below shows the position of a church (**C**) from a school (**S**).



Find the bearing of the church from the school.

$n + 76^\circ = 180^\circ$

$n + 76^\circ - 76^\circ = 180^\circ - 76^\circ$

$n = 104^\circ$

The bearing of the church from the school.

$= 180^\circ + 104^\circ$

$= 284^\circ$

∴ bearing of the church from the school $= 284^\circ$

19. If today is Monday and a cake baked today can expire after 16 days, what day of the week will the cake expire?

Approach I

Mon	Tue	Wed	Thur	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16					

∴ It will expire on Tuesday.

Approach II

Note: since the duration for expiry is starting from Monday, do not add 1. Instead consider Monday as Modula which is 0 but not 1.

16 = ____ (finite 7)

7 | 16 2 r 2

14

= 2 (finite 7)

Hence the cake will expire on Tuesday.

20. One morning, the temperature on top of a mountain was -3°C. The temperature rose by 8°C in the afternoon. Find the afternoon temperature.

Afternoon temperature = Morning temperature + temperature rise

= -3°c + 8°c.

∴ 5°c

SECTION B: 60 MARKS

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

Marks for each question are indicated in the brackets.

21. Work out: $\dfrac{2.92-2.36}{0.068+0.012}$ *(04 marks)*

$2.92 - 2.36 = 0.56$

$0.068 + 0.012 = 0.080$

$\dfrac{2.92-2.36}{0.068+0.012} = \dfrac{0.56}{0.080}$

$= \dfrac{56}{100} \div \dfrac{80}{1000}$

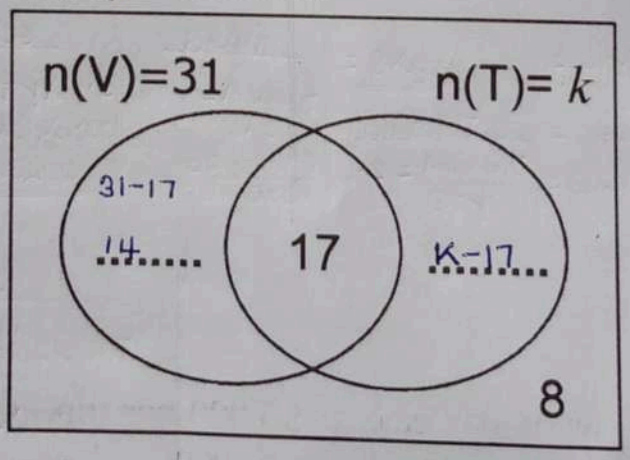
$= \dfrac{56}{100} \times \dfrac{1000}{80}$

$= 7$

22. In a class, 31 pupils like volleyball (V) and k pupils like table tennis (T). 17 pupils like both games while 8 pupils do not like any of the two games. The number of pupils who like table tennis only is twice the number of those who do not like any of the two games.

(a) Use the given information to complete the Venn diagram below. *(04 marks)*

$n(\mathcal{E}) = K + 22$



$n(\mathcal{E})$

$= 14 + 17 + K - 17 + 8$

$= 14 + 17 - 17 + 8 + K$

$= 14 + 8 + K$

$= 22 + K$

$= K + 22.$

(b) Find;

(i) the value of k. *(01 mark)*

$K-17 = 2X8$

$K-17 = 16$

$K-17+17 = 16+17$

$\therefore K = 33$

(ii) the probability that a pupil picked at random from the class likes both volleyball and table tennis. *(01 mark)*

Probability = Number of expected outcome / Number of sample space.

Number of expected outcomes = 17

Number of sample space.

$= K+22$

$= 33+22$

$= 55$

Probability $= \frac{17}{55}$

23. A taxi and a bus were hired to transport people for a function. The taxi transports 14 people when full while the bus transports 69 people when full. The taxi made five trips and the bus made one trip. The taxi and the bus made the trips when full.

(a) Find the total number of people that were transported to the function. *(03 marks)*

A taxi	A bus	Total
$^{2}14 \times 5 = 70$	69×1	$= 70 + 69 = 139$
$= 70$ people	$= 69$ people	$= 139$ people

$\therefore$ 139 people were transported to the function.

(b) The taxi owner was paid sh 56,000 per trip. Calculate the amount of money that was paid for each person. *(02 marks)*

Total amount of money collected from 5 trips.

$= sh.\ ^{3}56,000 \times 5$

$sh.280,000$

Amount paid by each person.

$= sh.\ \frac{^{4000}280,000}{70}$

$= sh.\ 4,000$

24. Given that $202_p = 1221_{three}$, find the value of p. *(04 marks)*

$202_p = 1221_{three}$

$(2 \times p^2) + (0 \times p^1) + (2 \times p^0) = (1 \times 3^3) + (2 \times 3^2) + (2 \times 3^1) + (1 \times 3^0)$

$2p^2 + 0 + 2 \times 1 = (1 \times 3 \times 3 \times 3) + (2 \times 3 \times 3) + (2 \times 3) + (1 \times 1)$

$2p^2 + 2 = 27 + 18 + 6 + 1$

$2p^2 + 2 = 52$

$2p^2 + 2 - 2 = 52 - 2$

$2p^2 = 50$

$\frac{2p^2}{2} = \frac{50}{2}$ $\quad \frac{25}{1}$

$p^2 = 25$

$\sqrt{p^2} = \sqrt{25}$

$p = \sqrt{5 \times 5}$

$p = \sqrt{5^2}$

$\therefore p = 5$

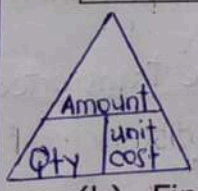
P.O.W

25
5 ^ 5
5 ^ 1

25. The table below shows the amount of money Rukia paid for food stuff to a businesswoman after she was given a discount of sh 2,200.

(a) Study and complete the table. *(03 marks)*

Item	Quantity	Cost per kg	Amount
Rice	4 kg	sh 3,800	sh 15,200
Beans	6 kg	sh 5,000	sh 30,000
Irish Potatoes	0.5 kg	sh 3,200	sh 1,600
Total			**sh 46,800**



Rice

$A = Qty \times U.C$

$= 4 \times sh.3,800$

$= sh.15,200$

Beans

$Qty = \frac{Amount}{U.C}$

$= \frac{sh.30,000}{sh.5,000}$

$= 6Kg$

Irish Potatoes

$U.C = \frac{Amount}{Qty}$

$= \frac{sh.1,600}{0.5}$

$= sh.1,600 \div \frac{1}{2}$

$= sh.1,600 \times \frac{2}{1}$

$= sh.3200$

(b) Find how much money Rukia would have paid without the discount. *(02 marks)*

Marked Price.

= Cash price + discount

= sh. 46,800 + sh. 2,200

= sh. 46,800
+ sh. 2200
sh. 49,000

∴ Rukia would have paid sh. 49,000 without the discount.

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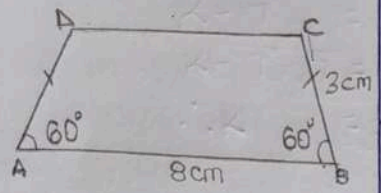
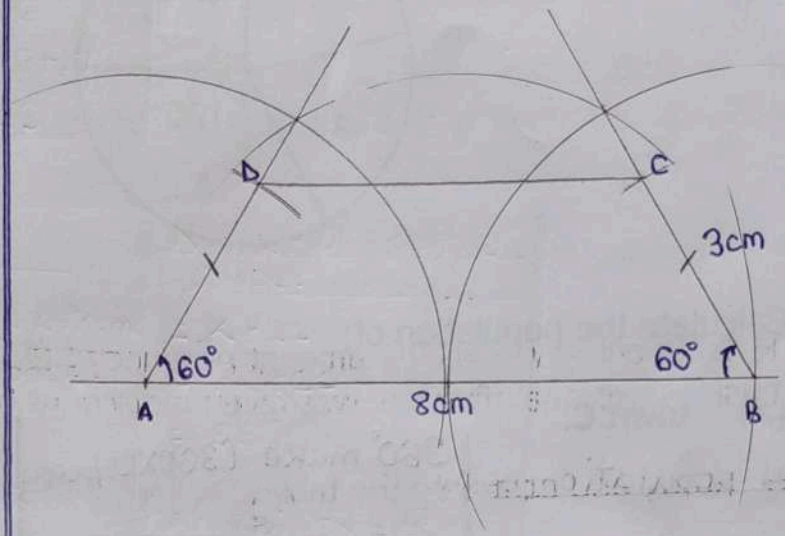
26. (a) Using a ruler and a pair of compasses only, construct a trapezium ABCD in which line AB = 8 cm, angle DAB = angle ABC = 60° and line AD = BC = 3 cm. *(04 marks)*

A sketch figure

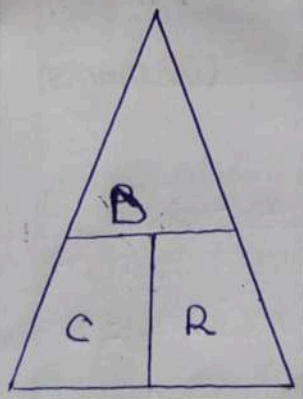


An accurate figure.



(b) Measure angle ADC. ....120°..... *(01 mark)*

27. A motorcycle tyre made 40 complete turns to cover a distance of 5280 cm. Calculate the radius of the tyre. (Use $\pi = \frac{22}{7}$) *(04 marks)*



Distance = 5,280cm
Revolutions = 40turns
circumference = ?

$C = \frac{D}{R}$

$= \frac{5,280cm}{40}$

$= 132cm$

$C = 2\pi r$

$132cm = 2 \times \frac{22}{7} r$

$132cm = \frac{44r}{7}$

$7 \times 132cm = \frac{44r}{7} \times 7$

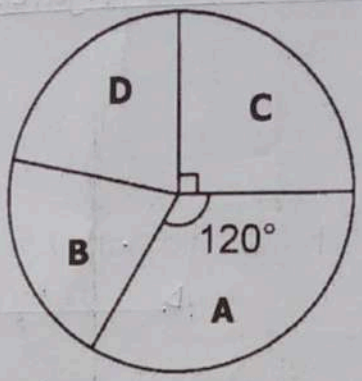
$\frac{7 \times 132cm}{44} = \frac{44r}{44}$

$(7 \times 3)cm = r$

$21cm = r$

$\therefore r = 21cm$

28. The pie chart below represents the population of four towns **A, B, C** and **D.** The population of town **A** is 3000 people and that of town **B** is 1800 people. Study the pie chart and use it to answer the questions that follow.



Calculate the population of;

(a) town **C.** (04 marks)

Total population of the four towns.

120° make 3,000 people

1° makes $\frac{3000}{120}$ people

1° makes 25 people

360° make (360 × 25) people

= 9,000 people

Population of town C

$= \frac{90^{\circ}}{360^{\circ}} \times 9{,}000$ people.

$= \frac{1}{4} \times 9{,}000$ people.

= 2,250 people

(b) town **D.** (02 marks)

Population of town D.

= 9,000 − (3,000 + 1,800)

= 9,000 − 4,800

= 4,200 people

= (4,200 people) − (2,250 people)

= 4,200 − 2,250

= 1,950 people

= 1,950 people

29. (a) Solve: $\frac{5t-6}{2} = t+12$ (02 marks)

$\frac{5t-6}{2} = \frac{t+12}{1}$

$5t-6 = 2(t+12)$

$5t-6 = 2t+24$

$5t-6+6 = 2t+24+6$

$5t = 2t+30$

$5t-2t = 2t-2t+30$

$3t = 30$

$\frac{3t}{3} = \frac{30}{3}$

$\therefore t = 10$

(b) Subtract $(2m - 3)$ from $(5m + 2)$. *(02 marks)*

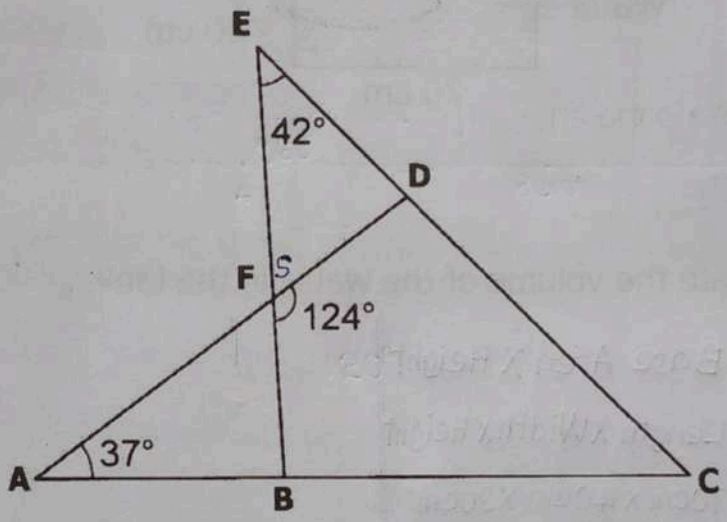
$= (5m+2) - (2m-3)$.

$= 5m+2-2m+3$.

$= 5m-2m+2+3$

$= 3m+5$

30. In the diagram below, angle DAC = 37°, angle BEC = 42° and angle BFD = 124°. Study the diagram and answer the questions that follow.



Find the size of;

(a) angle EBC. *(03 marks)*

$S + 124° = 180°$ (Angles on a straight line)

$S + 124° - 124° = 180° - 124°$

$S = 56°$

Angle EBC.

$= 56° + 37°$ (sum of two interior angles is equal to one opposite exterior angle)

$= 56° + 37° = 93°$

∴ angle EBC = 93°

(b) angle DCA. *(02 marks)*

Angle ADC

$= 42° + 56°$ (sum of two interior angles is equal to one opposite exterior angle)

$= 98°$

let h be angle DCA.

$h + 98° + 37° = 180°$ (sum of interior angles of a triangle)

$h + 135° = 180°$

$h + 135° - 135° = 180° - 135°$.

$h = 45°$

∴ angle DCA = 45°

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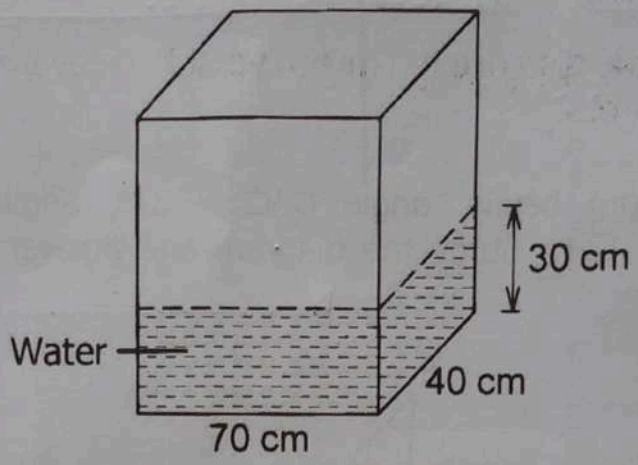
31. The diagram below shows a tank with a rectangular base containing some water. Study and use it to answer the questions that follow.



(a) Calculate the volume of the water in the tank. (*02 marks*)

Volume = Base Area X Height

Volume = Length X Width X Height

Volume = (70cm X 40cm) X 30cm

Volume = $2800cm^2 \times 30cm$

∴ Volume = $84,000cm^3$

(b) If 28 litres of the water was removed for washing clothes, calculate the height of the water that remained in the tank. (*04 marks*)

Volume of water removed.

From;

capacity = $\frac{\text{Volume}}{1,000cm^3}$

$\frac{28}{1} = \frac{\text{Volume}}{1,000cm^3}$

Volume = $28 \times 1,000cm^3$

= $28,000cm^3$

Volume of the remaining water in the tank.

= $84,000cm^3$

− $28,000cm^3$

$56,000\ cm^3$

= $56,000cm^3$

From;

Volume = Base Area X Height

$56,000cm^3$ = L X W X H

$56,000cm^3 = 70cm \times 40cm \times H$

$\frac{56,000cm^3}{70cm \times 40cm} = \frac{70cm \times 40cm \times H}{70cm \times 40cm}$

20cm = H

∴ H = 20cm.

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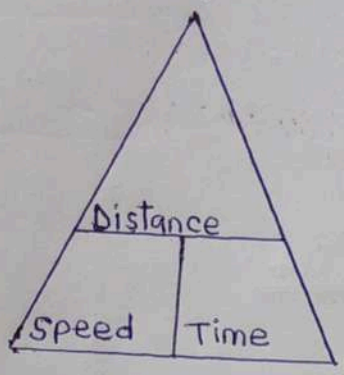
32. A motorcyclist left home for town at 8:00 a.m. riding at a speed of 40 km/h. After 30 minutes, he got a flat tyre which took him 45 minutes to repair. The distance between the home of the motorcyclist and town is 68 km.

(a) Find the distance the motorcyclist had covered before he got the flat tyre. *(02 marks)*



Distance = speed × Time

$= 40\text{Kmlh} \times \frac{30}{60}\text{h}$

$= \frac{20}{40}\text{Km} \times \frac{1}{\cancel{60}}\text{h}$

$= 20\text{Km} \times 1$

$= 20\text{Km}$

(b) Calculate the speed at which the motorcyclist had to ride in order to reach town at 10:00 a.m. *(04 marks)*

Total time taken from home up to repair of a tyre

Hours	Minutes
00	45
+ 00	30
1	15

4+3=7
7÷6
=1r1

= 1hour 15minutes.

starting time after the repair.

Hours	Minutes
8	00
+ 1	15
9	15 am

= 9:15am

Time taken to cover the remaining journey

Hours	Minutes
10	60
− 9	15
00	45

= 45minutes

$= \frac{45}{60}\text{h}$

Remaining distance

= 68Km
− 20Km
48 Km

speed used

$\text{speed} = \frac{\text{Distance}}{\text{Time}}$

$= \frac{48\text{Km}}{1} \div \frac{45}{60}\text{h}$

$= \frac{16}{\cancel{48}}\text{Km} \times \frac{\overset{4}{\cancel{60}}}{\underset{3}{\cancel{45}}}\text{h}$

$= (16 \times 4)\text{Kmlh}$

$= 64\text{Kmlh}$.

END