



UGANDA NATIONAL EXAMINATIONS BOARD

PRIMARY LEAVING EXAMINATION

2022

MATHEMATICS

Time Allowed: 2 hours 30 minutes

Random No.						Personal No.		

Candidate's Name: ..... AMIDE .....

Candidate's Signature: ..... [Signature] .....

District ID No. 

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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 provided.
4. **All** working **must** be done using a **blue** or **black** ball point pen or ink. Any work done in pencil other than on 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	10	
6 - 10	10	
11 - 15	10	
16 - 20	10	
21 - 22	10	
23 - 24	10	
25 - 26	09	
27 - 28	10	
29 - 30	10	
31 - 32	11	
TOTAL	100%	mJ

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Turn Over

# SECTION A: 40 MARKS

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

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

F1.  
K  
P3

Work out:  $\frac{3}{5} + \frac{1}{5}$

$$\frac{3+1}{5} = \frac{4}{5}$$

2.  
WNA  
C  
P6

Write 546 in Roman numerals.

$$546 = 500 + 40 + 6 = D + XL + VI = DXLVI$$

3.  
OPH  
C  
P3

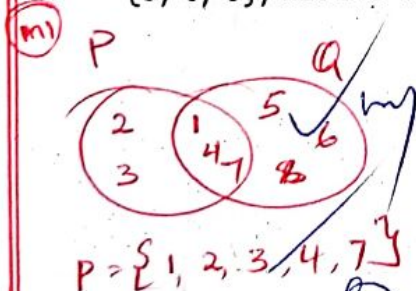
Work out:

$$\begin{array}{r} 127 \\ \times 3 \\ \hline 381 \end{array}$$

$$100 + 20 + 7 + 300 + 60 + 21 = 381$$

4.  
SET  
C  
P6

Given that  $P \cup Q = \{1, 2, 3, 4, 5, 6, 7, 8\}$ ,  $P \cap Q = \{1, 4, 7\}$  and  $P' = \{5, 6, 8\}$ , list the elements of set P.



(m2)  $P \cup Q = \{1, 2, 3, 4, 5, 6, 7, 8\}$   
 $P \cap Q = \{1, 4, 7\}$   
 $P' = \{5, 6, 8\}$   
 $Q' = \{2, 3\}$   
Set P =  $Q' \cup P \cap Q = \{1, 2, 3, 4, 7\}$

5.  
HPS  
C  
P5

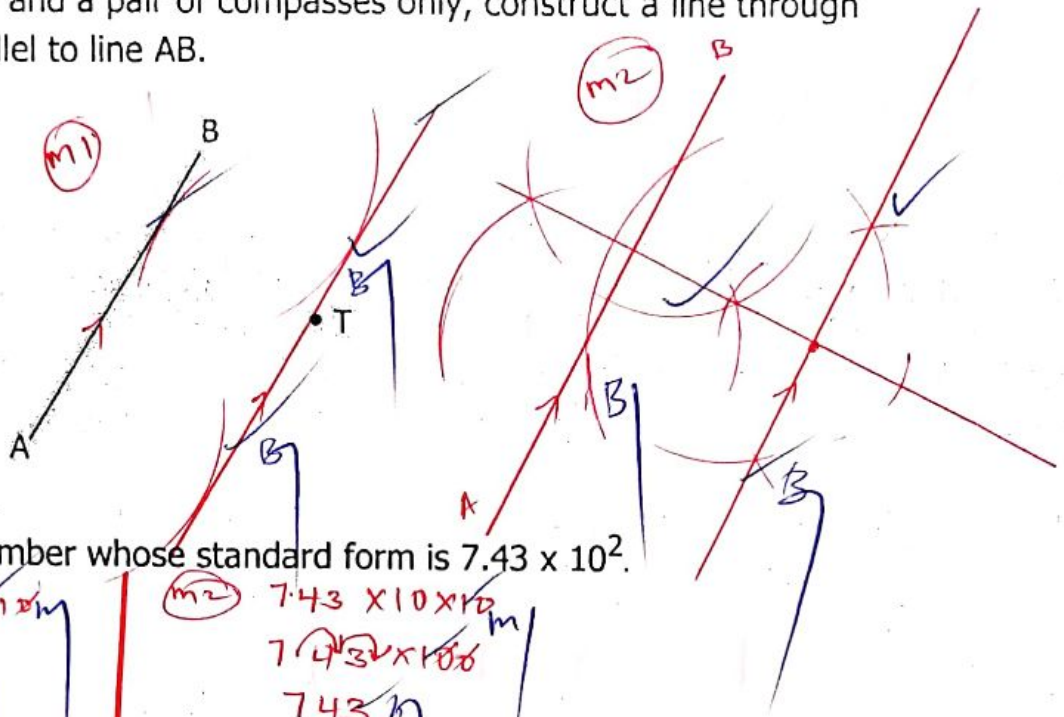
Find the next number in the sequence:

Sequence: 1, 3, 7, 13, 21, 31, ...  
Differences: +2, +4, +6, +8, +10, ...  
Next number: 31 + 12 = 43

10



6. Using a ruler and a pair of compasses only, construct a line through point T parallel to line AB.

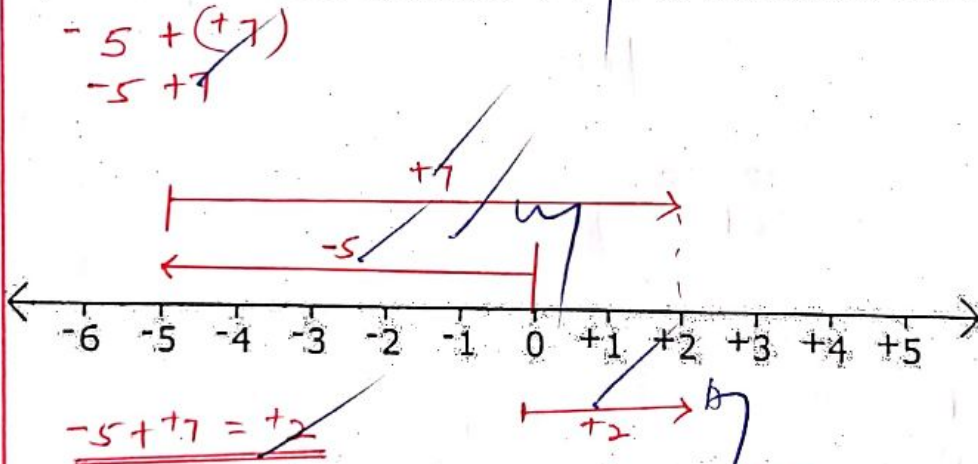


7. Write the number whose standard form is  $7.43 \times 10^2$ .

$$\begin{array}{r} 743 \\ \times 100 \\ \hline 74300 \end{array}$$

$$7.43 \times 10 \times 10 = 743 \times 100 = 74300$$

8. Represent the number operation  $-5 + +7$  on the number line below.



9. Solve:  $2a - 6 = 10$

$$2a - 6 = 10$$

$$2a - 6 + 6 = 10 + 6$$

$$2a = 16$$

$$\frac{2a}{2} = \frac{16}{2}$$

$$a = 8$$

$$2a - 6 = 10$$

$$2a = 10 + 6$$

$$2a = 16$$

$$\frac{2a}{2} = \frac{16}{2}$$

$$a = 8$$

$$2a - 6 = 10$$

$$-6 - 10 = -2a$$

$$-16 = -2a$$

$$\frac{-16}{-2} = \frac{-2a}{-2}$$

$$8 = a$$

$$a = 8$$

10. A packet of biscuits weighs 200 grammes. Calculate the total weight in kilograms of 30 packets of biscuits.

LMC  
A  
PS

$$1 \text{ pkt} = 200 \text{ g}$$

$$30 \text{ pkts} = 30 \times 200 \text{ g}$$

$$= 6000 \text{ g}$$

$$\frac{1 \text{ kg}}{1000 \text{ g}} = \frac{6000 \text{ g}}{1000 \text{ g}}$$

$$K = 6 \text{ kg}$$

$$K = \frac{6000 \text{ g}}{1000 \text{ g}} \times 1 \text{ kg}$$

$$K = 6 \text{ kg}$$

10

11. The drawings below show cards with numbers written on them.

DATA  
A  
P6



The cards were then put in a bag. Find the probability that a card picked at random from the bag has a composite number.



Composite nos = 4, 6, 8, 9

$$P = \frac{n(D)}{n(S)} = \frac{4}{6}$$

Work out:

$$\begin{array}{r} 1001_{\text{two}} \\ - 111_{\text{two}} \\ \hline 0010_{\text{two}} \end{array}$$

$$1H = \frac{2}{2} = 1 \text{ ten}$$

$$1H = \frac{2}{2} = 1 \text{ ten}$$

$$1H = \frac{2}{2} = 1 \text{ ten}$$

$$1H = \frac{2}{2} = 1 \text{ ten}$$

- 13.

MONEY  
A  
PS

A poultry farmer sells 30 eggs at sh 12,000. Find the cost of 25 eggs.

$$30 \text{ eggs} = \text{sh } 12000$$

$$25 \text{ eggs} = y$$

$$y = \frac{25 \text{ eggs}}{30 \text{ eggs}} \times \text{sh } 12000$$

$$y = \text{sh } 10000$$

(m2)

$$30 \text{ eggs} = \text{sh } 12000$$

$$1 \text{ egg} = \frac{\text{sh } 12000}{30}$$

$$1 \text{ egg} = \text{sh } 400$$

$$25 \text{ eggs} = 25 \times \text{sh } 400$$

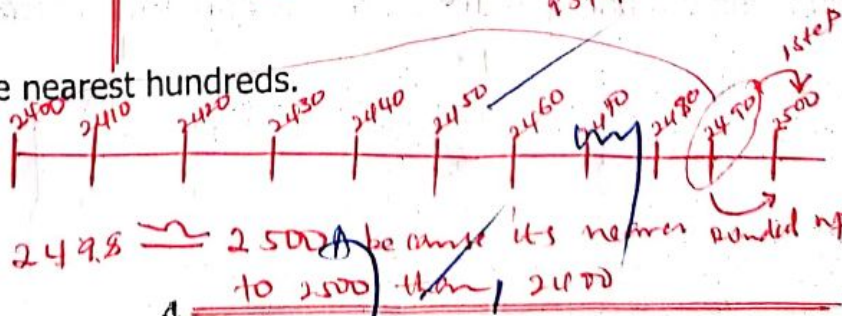
$$= \text{sh } 10000$$

- 14.

OPH  
C  
P.5

Round off 2498 to the nearest hundreds.

$$\begin{array}{r} 2498 \\ + 100 \\ \hline 2500 \end{array}$$





15. The weight of a teacher is 72 kg. The average weight of the teacher and three pupils is 50 kg. Calculate the total weight of the pupils.

DATA  
C  
P.6

Teacher = 72 kg

Total of 4 =  $4 \times 50$   
= 200 kg

Total of 3 pupils  
=  $200 \text{ kg} - 72 \text{ kg}$   
= 128 kg

Teacher = 72 kg

3 pupils + Teacher  
 $N = \frac{\text{Sum of data}}{\text{No of data}}$

$50 = \frac{T}{4}$

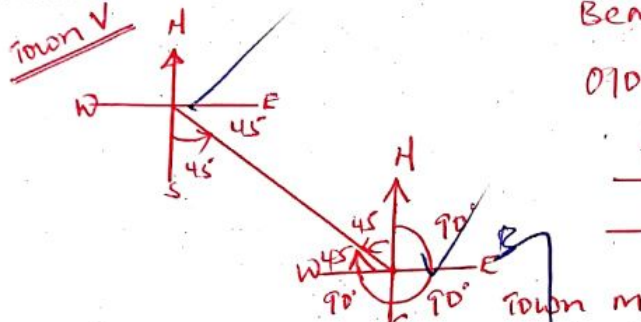
$50 \times 4 = \frac{T}{1} \times 4$   
 $200 = T$   
Total of 4 = 200 kg

Weight of 3 pupils  
 $\frac{200 \text{ kg}}{1} - 72 \text{ kg}$   
= 128 kg

10

16. Town M is South East of town V. Find the bearing of town V from town M.

LAH  
A  
P.7



Bearing

090 + 90 + 90 + 45

$\frac{270}{1} + 45$   
= 315

17. A businesswoman borrowed sh 100,000 from a savings group which charged her an interest rate of 3% per month. Calculate the interest she paid after a period of six months.

FRA  
A  
P.6

$SI = P \times R \times T$

$SI = \text{sh } 100,000 \times \frac{3\%}{100} \times 6 \text{ months}$

$SI = \text{sh } 100,000 \times \frac{3}{100} \times 6$

$SI = \text{sh } 18,000$

18. Peter walked a distance of 2 km in 20 minutes. Find his speed in kilometers per hour.

SDT  
C  
P.5

20 minutes to hrs

$T = \left( \frac{20 \text{ min}}{60 \text{ min}} \right) \text{ hrs}$

$T = \frac{1}{3} \text{ hr}$

$S = \frac{D}{T}$

$S = 2 \text{ km} \div \frac{1}{3} \text{ hr}$

$S = 2 \text{ km} \times \frac{3}{1 \text{ hr}}$

$S = 6 \text{ km/hr}$

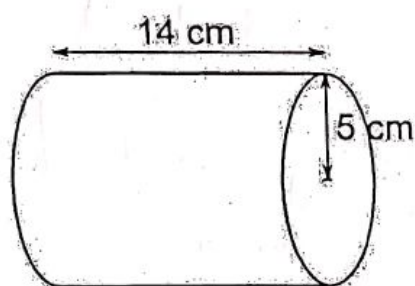
19. Given that  $m = 8$  and  $n = 6$ , find the value of  $\sqrt{mn+1}$ .

ALG  
C  
P.6

$$\begin{aligned} &\sqrt{m \times n + 1} \\ &\sqrt{(8 \times 6) + 1} \\ &\sqrt{48 + 1} \quad \begin{array}{r} 7 \overline{)49} \\ 49 \\ \hline 0 \end{array} \\ &\sqrt{49} \quad \begin{array}{r} 7 \overline{)49} \\ 49 \\ \hline 0 \end{array} \\ &\sqrt{7^2} \\ &\underline{7} \end{aligned}$$

20. Calculate the volume of the cylinder below. (Use  $\pi = \frac{22}{7}$ )

LMC  
C  
P.7



$$\begin{aligned} V &= \text{Base area} \times \text{Height} \\ V &= \pi r^2 \times h \\ V &= \frac{22}{7} \times 5\text{cm} \times 5\text{cm} \times 14\text{cm} \\ V &= \underline{1100\text{cm}^3} \end{aligned}$$

10

## SECTION B: 60 MARKS

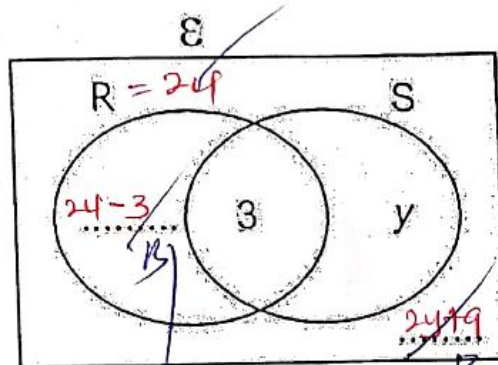
Answer **all** the questions in this section.

Marks for each question are indicated in brackets.

21. In a village, 3 farmers grow both rice (R) and sunflower (S). 24 farmers grow rice and  $y$  farmers grow sunflower only.  $2y + 9$  farmers grow none of the two crops.

SET C  
C  
P-7

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



- (b) Given that the number of farmers who grow rice only is equal to the number of farmers who grow none of the two crops, find the value of  $y$ . (02 marks)

$$\begin{aligned}
 2y + 9 &= 24 - 3 \\
 2y + 9 &= 21 \\
 2y &= 21 - 9 \\
 2y &= 12 \\
 y &= 6
 \end{aligned}$$

- (c) How many farmers grow sunflower? (01 mark)

$$\begin{aligned}
 (24 - 3 + 3 + y + 2y + 9) &\text{ farmers} \\
 (21 + 3 + 6 + 2 \times 6 + 9) &\text{ farmers} \\
 (30 + 12 + 9) &\text{ farmers} \\
 \underline{51} &\text{ farmers}
 \end{aligned}$$



22.  
MONEY  
A  
P.5

A trader bought 500 mangoes at sh 250 each. The trader then sold 100 of the mangoes at sh 350 each and the rest at sh 300 each. Calculate the profit the trader made.

(05 marks)

BP of 500 mangoes:

$$\text{sh } (500 \times 250) \\ \text{sh } 125,000 \checkmark$$

SP of 100 mangoes:

$$\text{sh } 350 \times 100 \\ \text{sh } 35,000 \checkmark$$

Remaining mangoes:

$$\begin{array}{r} 500 \text{ mangoes} \\ - 100 \text{ mangoes} \\ \hline 400 \text{ mangoes} \end{array}$$

SP of 400 mangoes:

$$400 \times \text{sh } 300 \\ \text{sh } 120,000 \checkmark$$

Total SP of all mangoes

$$\begin{array}{r} \text{sh } 35,000 \\ + \text{sh } 120,000 \\ \hline \text{sh } 155,000 \end{array}$$

$$P = SP - BP$$

$$\begin{array}{r} P = \text{sh } 155,000 \\ - \text{sh } 125,000 \\ \hline \text{sh } 30,000 \checkmark \\ \text{sh } 30,000 \end{array}$$

10

23.  
F  
C  
P.6

Work out:

$$\frac{0.75 + 0.25}{0.65 - 0.4}$$

$$\begin{array}{r} 0.75 \\ + 0.25 \\ \hline 1.00 \end{array} \quad \begin{array}{r} 0.65 \\ - 0.4 \\ \hline 0.25 \end{array}$$

$$\begin{array}{r} 100 \div 25 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 + \frac{2}{3} \\ 6 + \frac{25}{100} \\ 6 + \frac{25}{100} \\ 6 + \frac{25}{100} \\ \hline 6.666 \end{array}$$

m2

$$\begin{array}{r} 0.75 \\ + 0.25 \\ \hline 1.00 \end{array} \quad \begin{array}{r} 0.65 \\ - 0.4 \\ \hline 0.25 \end{array}$$

$$\begin{array}{r} 1.00 \div 0.25 \\ \hline 4 \end{array}$$

(04 marks)

$$\begin{array}{r} 0.75 \\ + 0.25 \\ \hline 1.00 \end{array} \quad \begin{array}{r} 0.65 \\ - 0.4 \\ \hline 0.25 \end{array}$$

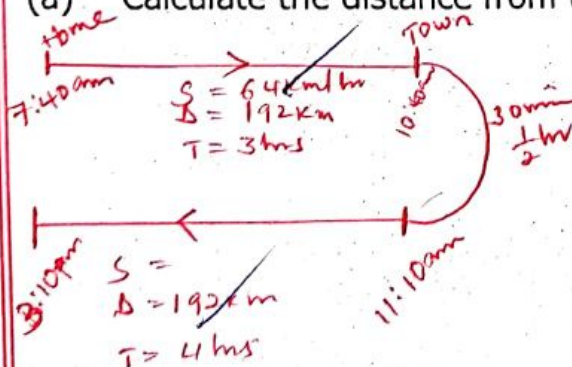
$$\begin{array}{r} 1 \div 0.25 \\ \hline 4 \end{array}$$

24.  
SDT  
A  
P.6

A motorist left his home at 7:40 a.m. and travelled to town for 3 hours at an average speed of 64 km/h. He stayed in town for 30 minutes and then travelled back home.

(a) Calculate the distance from the motorist's home to the town.

(02 marks)



$$\begin{array}{l} A = S \times T \\ D_1 = 64 \text{ km/hr} \times 3 \text{ hrs} \\ D_1 = \frac{64 \text{ km}}{\text{hr}} \times 3 \text{ hrs} \\ D_1 = 192 \text{ km} \end{array}$$



(b) At what time did the motorist leave the town?

Time to Reach Town

$$\begin{array}{r} \text{hrs} \quad \text{min} \\ 7 \quad 40 \\ + 3 \quad 00 \\ \hline 10 \quad 40 \text{ am} \end{array}$$

Time to Leave Town

$$\begin{array}{r} \text{hrs} \quad \text{min} \\ 10 \quad 40 \\ + 30 \\ \hline 11 \quad 10 \text{ am} \end{array}$$

70 km / 60 min = 1 hr 10 min

M2

(01 mark)

ST → ET

7:40a → 8:40a  
8:40a → 9:40a  
9:40a → 10:40a  
10:40a → 11:00a (20 min)  
11:00a → 11:10a (10 min)

(c) Calculate the speed at which the motorist travelled back if he reached home at 3:10 p.m.

(03 marks)

M1

ST → ET

11:10a → 12:10pm  
12:10pm → 1:10pm  
1:10pm → 2:10pm  
2:10pm → 3:10pm

D = (1+1+1+1) hr  
D = 4 hrs.

Duration

$$\begin{array}{r} \text{hrs} \quad \text{min} \\ 15 \quad 10 \\ - 11 \quad 10 \\ \hline 04 \quad 00 = 4 \text{ hrs} \end{array}$$

M2 11:10a → 2:4

11:10 → 11:00  
+ 00:00  
11:00 hrs

8:10 pm to 2:4

$$\begin{array}{r} \text{hrs} \quad \text{min} \\ 3 \quad 10 \\ + 12 \quad 00 \\ \hline 15 \quad 10 \text{ hr} \end{array}$$

$$S = \frac{D}{T}$$

$$S = \frac{70 \text{ km}}{4 \text{ hrs}}$$

$$S = 17.5 \text{ km/hr}$$

10

25.  
MPS  
C  
P.6

The sum of three consecutive counting numbers is 78. Find the largest number.

(04 marks)

1st	2nd	3rd	Sum
P	P+1	P+2	78

$$P + P+1 + P+2 = 78$$

$$3P + 3 = 78$$

$$3P = 78 - 3$$

$$3P = 75$$

$$P = \frac{75}{3}$$

$$P = 25$$

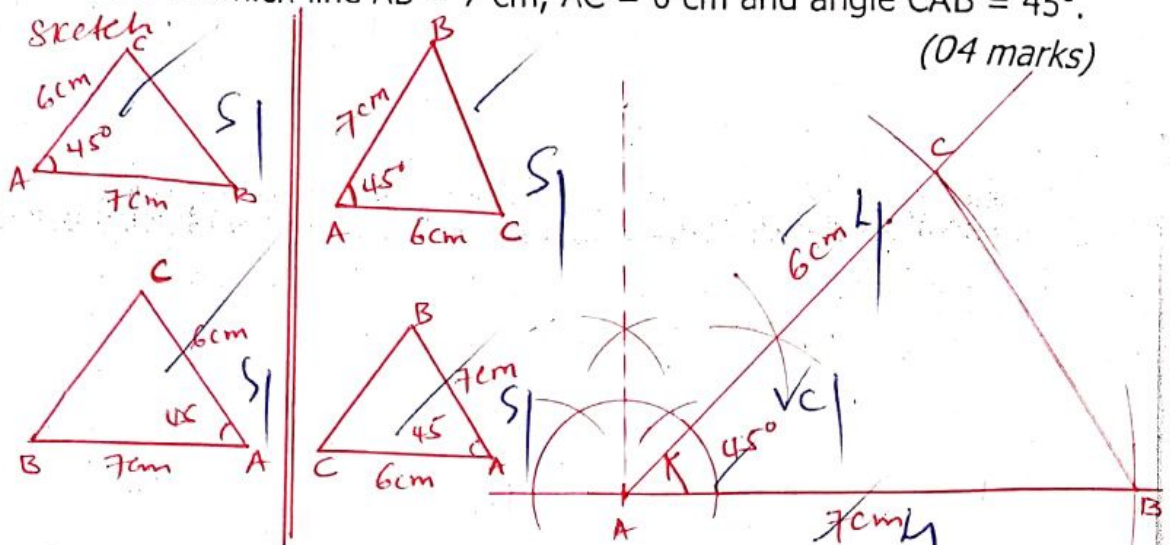
Largest no

$$\begin{array}{r} P+2 \\ 25+2 \\ \hline 27 \end{array}$$

26.

LAG  
A  
PG

- (a) Using a ruler and a pair of compasses only, construct triangle ABC in which line AB = 7 cm, AC = 6 cm and angle CAB =  $45^\circ$ . (04 marks)



- (b) Measure angle ACB.

79°  
78°  
77°

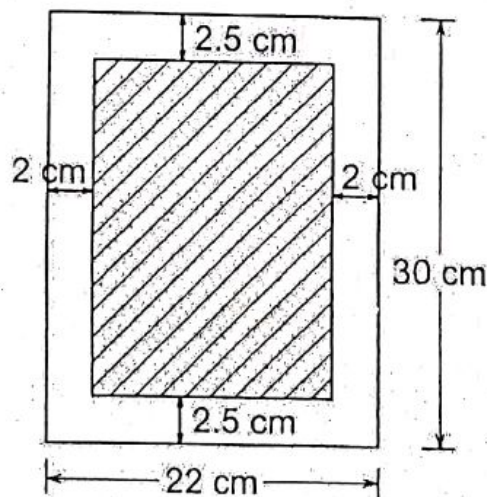
(01 mark)

09

27.

LMC  
A  
P.5

The figure below represents a photograph enclosed in a photo frame. The length of the photo frame is 30 cm and the width 22 cm. The area covered by the photograph is shaded. Study the figure and use it to answer the questions that follow.



- (a) Find the length of the photograph. (02 marks)

$$W = 30 \text{ cm} - (2.5 + 2.5) \text{ cm}$$

$$W = 30 \text{ cm} - 5 \text{ cm}$$

$$W = 25 \text{ cm}$$

$$L = 22 \text{ cm} - (2 + 2) \text{ cm}$$

$$L = 22 \text{ cm} - 4 \text{ cm}$$

$$L = 18 \text{ cm}$$



- (b) Calculate the area of the frame **not** covered by the photograph. (04 marks)

width of photograph.

$$L = 22\text{ cm} - (2\text{ cm} + 2\text{ cm})$$

$$L = 22\text{ cm} - 4\text{ cm}$$

$$L = 18\text{ cm}$$

Area of photo

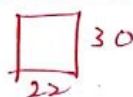
$$A = L \times W$$

$$A = 18\text{ cm} \times 25\text{ cm}$$

$$A = (18 \times 25)\text{ cm}^2$$

$$A = 450\text{ cm}^2$$

Area of the Frame



$$A = L \times W$$

$$A = 22\text{ cm} \times 30\text{ cm}$$

$$A = 660\text{ cm}^2$$

Area of space left

$$660\text{ cm}^2$$

$$- 450\text{ cm}^2$$

$$210\text{ cm}^2$$

$$W = 30\text{ cm} - (2.5 + 2.5)\text{ cm}$$

$$W = 30\text{ cm} - 5\text{ cm}$$

$$W = 25\text{ cm}$$

28. A Mathematical set costs sh 2,000 more than an exercise book. The cost of two exercise books is the same as  $\frac{2}{5}$  of the cost of a mathematical set. Find the cost of an exercise book. (04 marks)

Set	book
$b + \text{sh}2000$	$b$

$$2b = \frac{2}{5} \text{ of } (b + \text{sh}2000)$$

$$2b \times 5 = \frac{2}{5} \times 5 (b + \text{sh}2000)$$

$$10b = 2b + \text{sh}4000$$

$$10b - 2b = \text{sh}4000$$

$$\frac{8b}{8} = \frac{\text{sh}4000}{8}$$

$$b = \text{sh}500$$

Set	Book
$b + \text{sh}2000$	$b$
$\text{sh}500 + \text{sh}2000$	$\text{sh}500$
$\text{sh}2500$	

Set	book
$b$	$b - \text{sh}2000$

$$\frac{2}{5} \text{ of } b = 2(b - \text{sh}2000)$$

$$\frac{2b}{5} = 2(b - \text{sh}2000)$$

$$\frac{2b}{5} \times 5 = 2 \times 2(b - \text{sh}2000)$$

$$2b = 10(b - \text{sh}2000)$$

$$2b = 10b - \text{sh}20,000$$

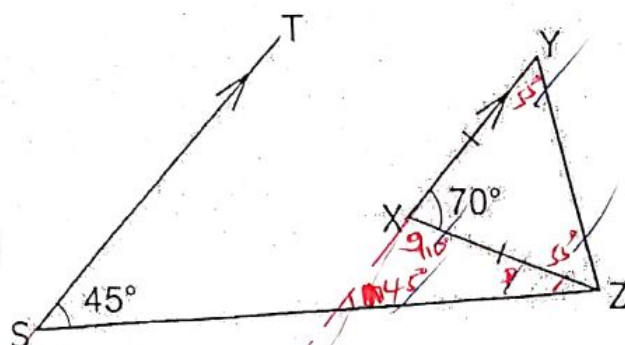
$$2b - 10b = -\text{sh}20,000$$

$$\frac{-8b}{-8} = \frac{-\text{sh}20,000}{-8}$$

$$b = \text{sh}2500$$

Set	Book
$\text{sh}2500$	$(b - \text{sh}2000)$
	$\text{sh}2500 - \text{sh}2000$
	$\text{sh}500$

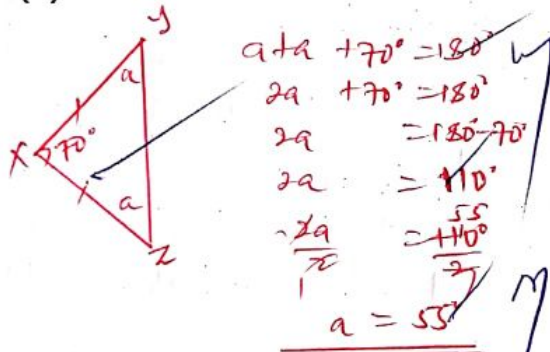
29. In the figure below, line  $XY = XZ$  and line  $TS$  is parallel to line  $XY$ . Angle  $TSZ = 45^\circ$  and angle  $YXZ = 70^\circ$ . Study the figure and use it to answer the questions that follow.



Find the size of angle;

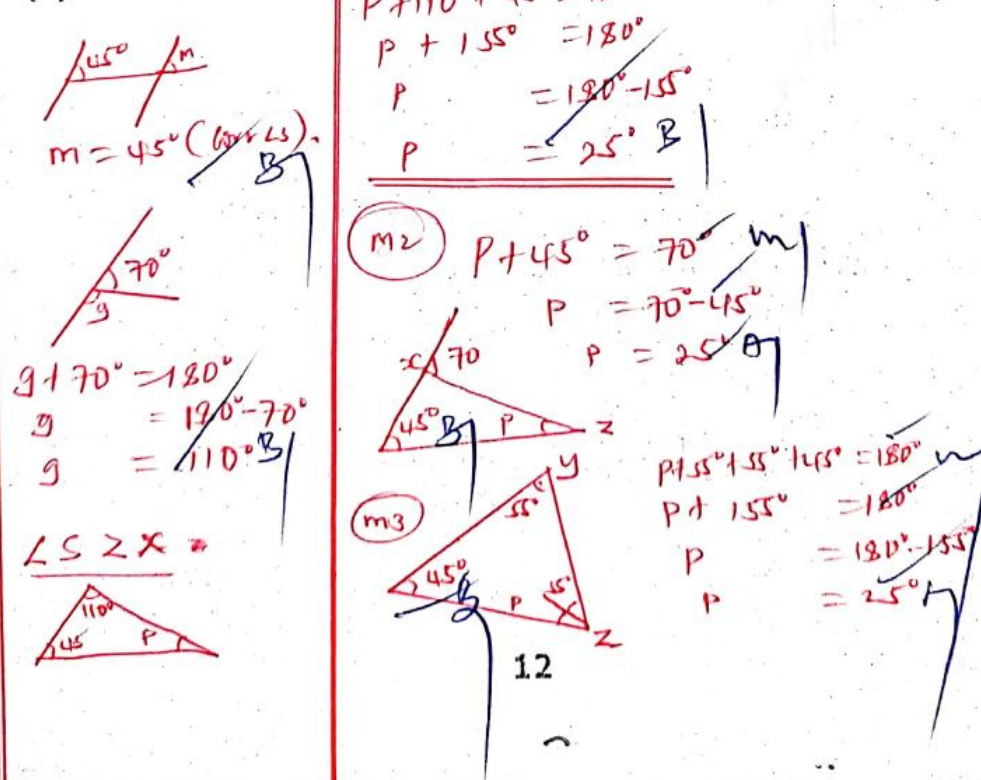
(a)  $\angle XYZ$

(02 marks)



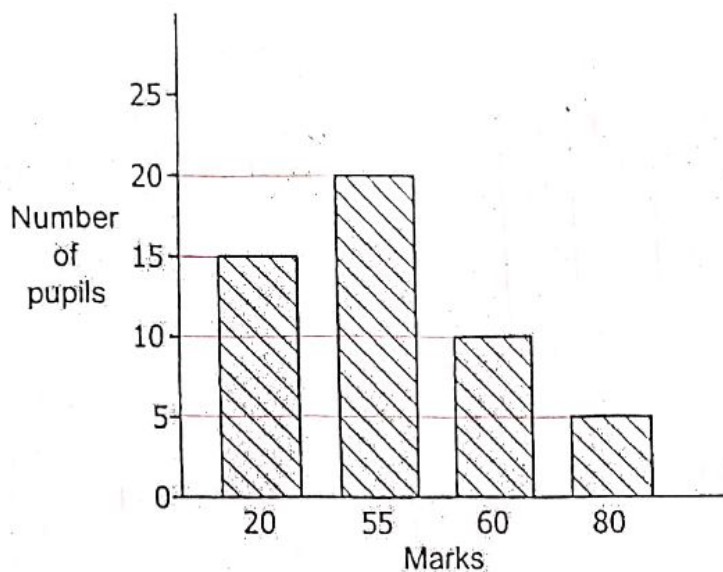
(b)  $\angle SZX$

(03 marks)





30. The bar graph below shows marks scored by pupils in a test. Study the graph and use it to answer the questions that follow.



- (a) Find the number of pupils who did the test.

(02 marks)

marks	20	55	60	80
No	15	20	10	5

$$\begin{aligned} \text{No of pupils} &= (15 + 20 + 10 + 5) \text{ pupils} \\ &= 50 \text{ pupils} \end{aligned}$$

- (b) Calculate the mean mark of the pupils.

(03 marks)

$$\text{Mean} = \frac{\text{Sum of data}}{\text{No of data}}$$

$$\bar{x} = \frac{(20 \times 15) + (55 \times 20) + (60 \times 10) + (80 \times 5)}{50} \text{ marks}$$

$$\bar{x} = \frac{300 + 1100 + 600 + 400}{50} \text{ marks}$$

$$\bar{x} = \frac{2400}{50}$$

$$\bar{x} = 48 \text{ marks}$$

10

31. A company supplied text books to three schools; F, G and H in the ratio 4:6:5 respectively. School F received 72 books less than school G.

(a) Find the number of text books supplied by the company. (03 marks)

F	G	H	Diff	T
4	6	5	6-4 2	15
4P	6P	5P	2P	15P
			72	

$$2P = 72$$

$$\frac{2P}{2} = \frac{72}{2}$$

$$P = 36$$

Total

$$15 \times P$$

$$15 \times 36$$

540 T. books

m2

$$F:G:H: \text{Total} : \text{Diff}$$

$$4:6:5:15:6-4$$

$$2$$

$$\frac{2}{15} \times \text{Total} = 72$$

$$\frac{15 \times 2}{2} = \frac{72 \times 15}{2}$$

$$15 = 36 \times 15$$

Total = 540 T. books

m3

(03 marks)

$$F:G:H: \text{Total} : \text{Diff}$$

$$4:6:5:15:6-4$$

$$2$$

$$72$$

$$2 \text{ parts} = 72 \text{ T. books}$$

$$1 \text{ part} = \frac{72}{2} = 36 \text{ T. books}$$

$$15 \text{ parts} = (36 \times 15) \text{ T. books}$$

$$= 540 \text{ T. books}$$

(b) Calculate the number of books school H got. (02 marks)

m1

$$H = 5P$$

$$H = 5 \times 36$$

$$H = 180 \text{ T. books}$$

m2

$$H = 5P$$

$$5 \times 36 = 180$$

180 T. books

m3

$$2 \text{ parts} \Rightarrow 72 \text{ T. books}$$

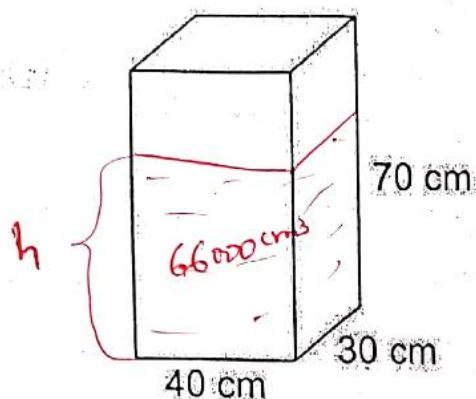
$$1 \text{ part} \Rightarrow \frac{72}{2} = 36 \text{ T. books}$$

$$5 \text{ parts} = 5 \times 36 \text{ T. books}$$

$$= 180 \text{ T. books}$$



32. The diagram below shows a tank full of water. The water leaks at a rate of 1.5 litres per hour. Study the diagram and use it to answer the questions that follow.



- (a) Find the capacity of the tank in litres. (02 marks)

$$V = BA \times H$$

$$V = L \times W \times H$$

$$V = 40 \text{ cm} \times 30 \text{ cm} \times 70 \text{ cm}$$

$$V = (40 \times 30 \times 70) \text{ cm} \times \text{cm} \times \text{cm}$$

$$V = 84000 \text{ cm}^3$$

$$\text{Capacity} = \frac{\text{Volume}}{1000 \text{ cm}^3} \times \text{litre}$$

$$C = \frac{84000 \text{ cm}^3}{1000 \text{ cm}^3} \times \text{litre}$$

$$C = 84 \text{ litres}$$

- (b) Calculate;

- (i) the amount of water in litres that will leak out of the tank in 12 hours. (01 mark)

$$1 \text{ hr} = 1.5 \text{ litres}$$

$$12 \text{ hrs} = 12 \times 1.5 \text{ litres}$$

$$= 12^6 \times 1.5$$

$$= 18 \text{ litres}$$

- (ii) the height of the water that remains in the tank after 12 hours.

Litres which remain

$$\begin{array}{r} 84 \text{ litres} \\ - 18 \text{ litres} \\ \hline 66 \text{ litres} \end{array}$$

Volume of the remainder

$$1 \text{ lit} = 1000 \text{ cm}^3$$

$$66 \text{ lit} = 66 \times 1000 \text{ cm}^3$$

$$= 66000 \text{ cm}^3$$

$$V = L \times W \times h$$

$$66000 \text{ cm}^3 = 40 \text{ cm} \times 30 \text{ cm} \times h$$

$$\frac{66000 \text{ cm}^3}{40 \text{ cm} \times 30 \text{ cm}} = \frac{40 \text{ cm} \times 30 \text{ cm} \times h}{40 \text{ cm} \times 30 \text{ cm}}$$

$$\frac{66000}{1200} = h$$

$$55 \text{ cm} = h$$

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1.5 Height = 55 cm

END