UGANDA NATIONAL EXAMINATIONS BOARD

PRIMARY LEAVING EXAMINATION

2022

MATHEMATICS

Time Allowed: 2 hours 30 minutes

Random No.						Personal No.		

Candidate's Name: Marking guide .....

Candidate's Signature: .....

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** 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		
6 - 10		
11 - 15		
16 - 20		
21 - 22		
23 - 24		
25 - 26		
27 - 28		
29 - 30		
31 - 32		
TOTAL		

Turn Over

SECTION A: 40 MARKS

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

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

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

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

$= \frac{4}{5}$

2. Write 546 in Roman numerals.

500 + 40 + 6

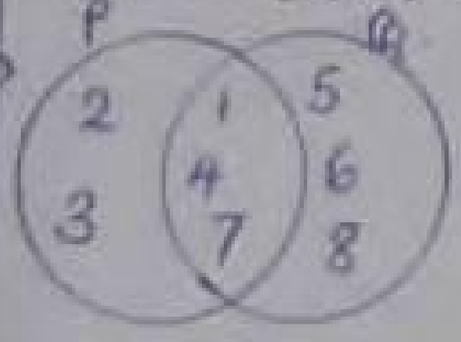
D XL VI

∴ 546 = DXLVI

3. Work out:

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

4. 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.



Set P = {2, 3, 1, 4, 7}.

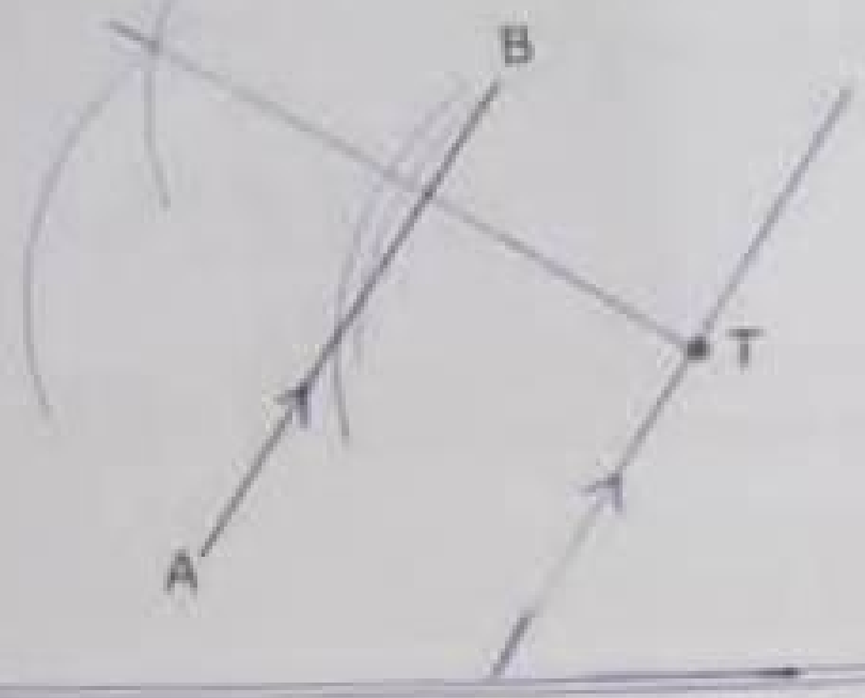
5. Find the next number in the sequence:

1, 3, 7, 13, 21, 31, ...

+2 +4 +6 +8 +10

21
+10
31

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

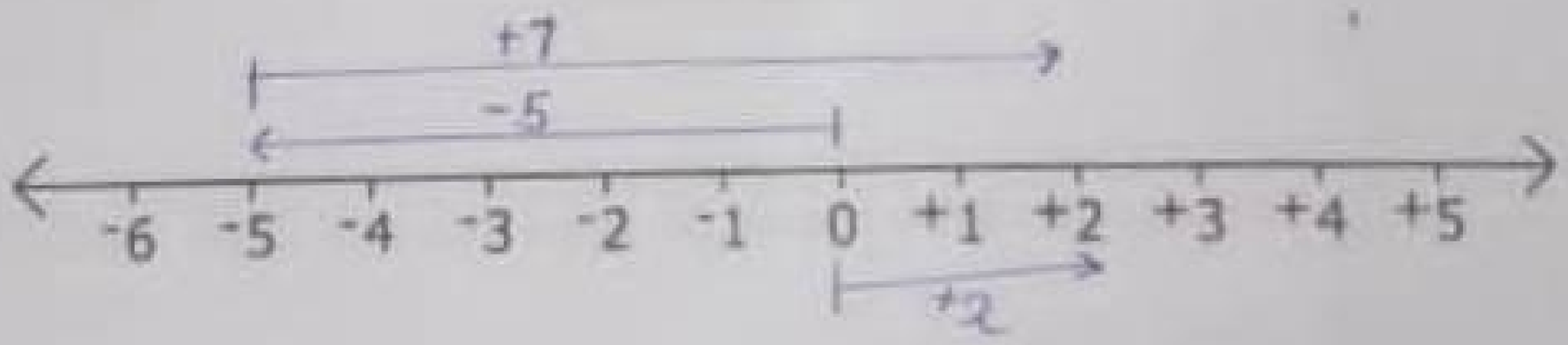


7. Write the number whose standard form is 7.43×10^2.

$\frac{743}{100} \times 10 \times 10$

$\frac{743}{100} \times 100 = 743$

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



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

$2a - 6 = 10$

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

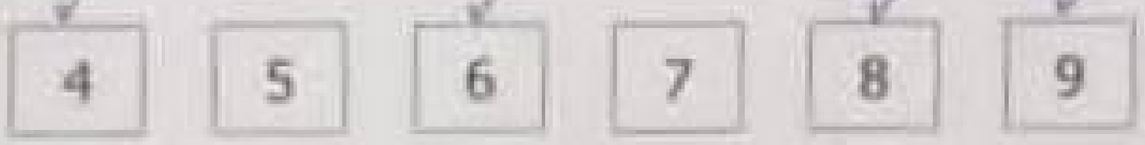
$\frac{2a}{2} = \frac{16}{2}$

$a = 8$

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

Total weight in grammes	Weight in kg
(200 x 30) gm	1000g = 1kg
6000gm	6000g = (6000/1000) kg
	6kg

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



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

Probability = n(E) / n(T)

Probability = 4/6

12. Work out:

$$\begin{array}{r} {}^{0}\cancel{1}\,{}^{1}\cancel{0}\,\cancel{0}\,1_{two} \\ -\;1\;1\;1_{two} \\ \hline 0\;0\;1\;0_{two} \end{array}$$

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

30 eggs cost sh 12000

1 egg cost sh 12000/30 = 400

sh 400

25 eggs cost sh 400 x 25

400 x 25 = 2000 + 800 = 10000

sh 10000

14. Round off 2498 to the nearest hundreds.

2498

2500

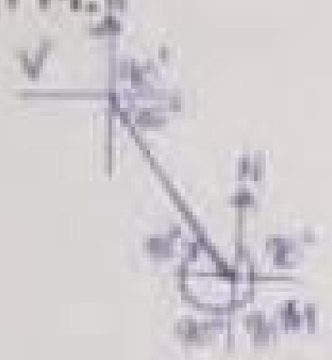
∴ 2498 ≈ 2500

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.

Total weight of 4 people
50kg
× 4
200kg

Total weight of 3 pupils
200kg
- 72kg
128kg

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



$= 90° + 90° + 90° + 45°$
$= 180° + 135°$
$= 315°$

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.

$I = P \times R \times T$
$I = sh.\ 100000 \times \frac{3}{100} \times 6$
$I = sh.\ 1000 \times 18$
$I = sh.\ 18000$

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

Speed = D ÷ T
But time
60min = 1hr
20min = $\frac{20}{60}$
$= \frac{1}{3}$ hr.

Speed = 2km ÷ $\frac{1}{3}$ hr.
Speed = 2km × $\frac{3}{1hr}$
Speed = 6km/hr

Turn Over

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

$\sqrt{m \times n + 1}$

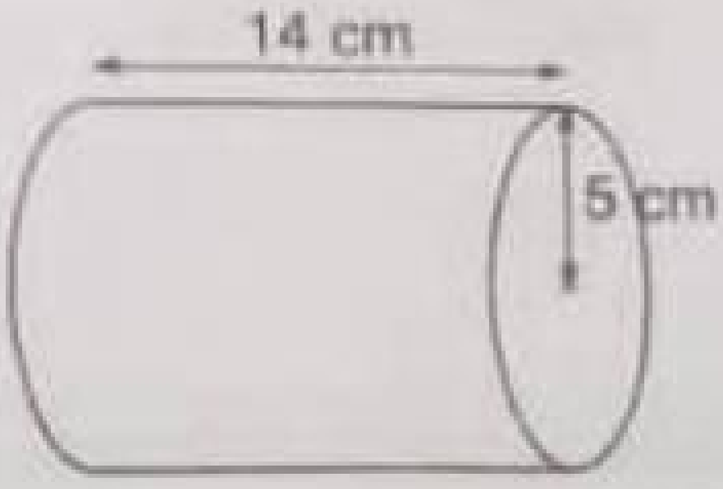
$\sqrt{8 \times 6 + 1}$

$\sqrt{48 + 1}$

$\sqrt{49}$

7

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



$V = \pi r^2 \times h$

$V = \frac{22}{7} \times 5cm \times 5cm \times 14cm$

$V = 22 \times 25cm^2 \times 2cm$

$V = 22 \times 50cm^3$

$V = 1100cm^3$

SECTION B: 60 MARKS

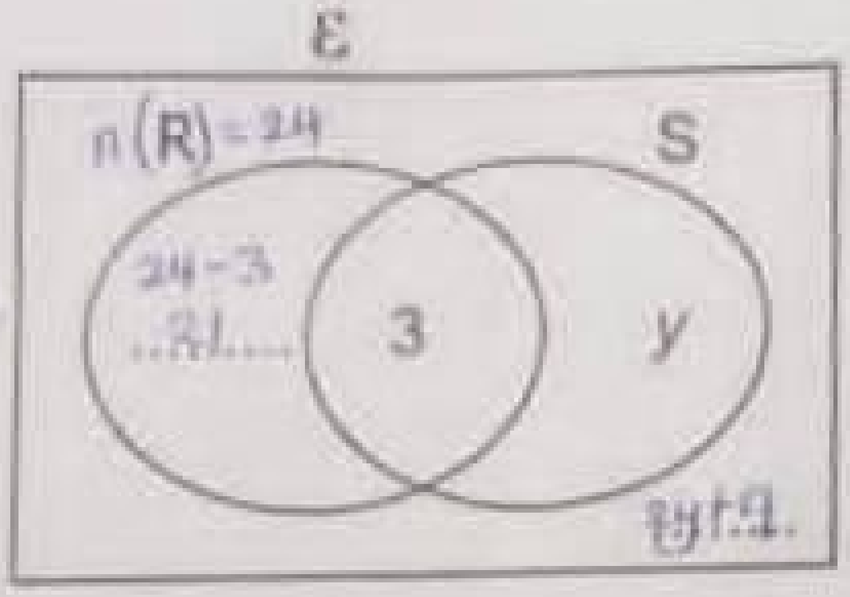
*Answer **all** the questions in this section.*

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.

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

Summary:
$n(R \cap S) = 3$
$n(R) = 24$
$n(S)$ only $= y$
$n(R \cup S)' = 2y + 9$



(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)*

$n(R \cup S)' = n(R)$ only
$2y + 9 = 21$
$2y + 9 - 9 = 21 - 9$
$\frac{2y}{2} = \frac{12}{2}$
$y = 6$

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

$n(S) = y + 3$
$n(S) = 6 + 3$
$n(S) = 9$ farmers

22. 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)*

Buying price of mangoes
sh 250 × 500
sh 125000

Selling price of 100 mangoes
sh 350 × 100
sh 35000

Selling price of (500 - 100) mangoes
sh 300 × 400
sh 120000

Total selling price of mangoes
sh 120,000
+ sh 35 000
sh 155 000

Profit = S.P − B.P
sh 155000
− sh 125000
sh 30000

23. Work out: $\dfrac{0.75 + 0.25}{0.65 - 0.4}$ *(04 marks)*

0·75
+0·25
1·00

0·65
−0·40
0·25

1·00 ÷ 0·25

$\frac{100}{100} \div \frac{25}{100}$

$\frac{100}{100} \times \frac{100}{25}$

4

24. 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)*

D = S × T

D = $\frac{64\text{km}}{\text{hr}} \times 3\text{hr}$

D = 192km

64
×3
192

(b) At what time did the motorist leave the town? *(01 mark)*

7:40 a.m | 70÷60 = 1r 10
3:00 hrs
+ 0:30 hrs
11:10 a.m

(c) Calculate the speed at which the motorist travelled back if he reached home at 3:10 p.m. *(03 marks)*

Speed = D÷T
But time
Duration = ET − ST

Ending time	Starting time
3:10 p.m	11:10 a.m
12 00hrs	00 00hrs
15 10hrs	11 10hrs

15 10hrs
−11 10hrs
04 00hr
= 4hrs

Speed = 48/4 km/hr
Speed = 48 km/hr

25. The sum of three consecutive counting numbers is 78. Find the largest number. *(04 marks)*

Let r be the smallest number.

1st no.	2nd no.	3rd no.	Sum
r	r+1	r+2	78

r + r+1 + r+2 = 78
r + r + r + 1 + 2 = 78
3r + 3 = 78
3r + 3 − 3 = 78 − 3
3r/3 = 75/3
r = 25

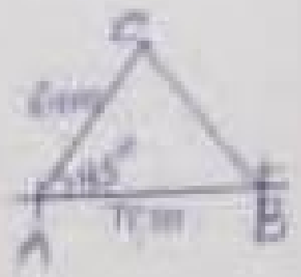
largest number = r+2
= 25+2
= 27

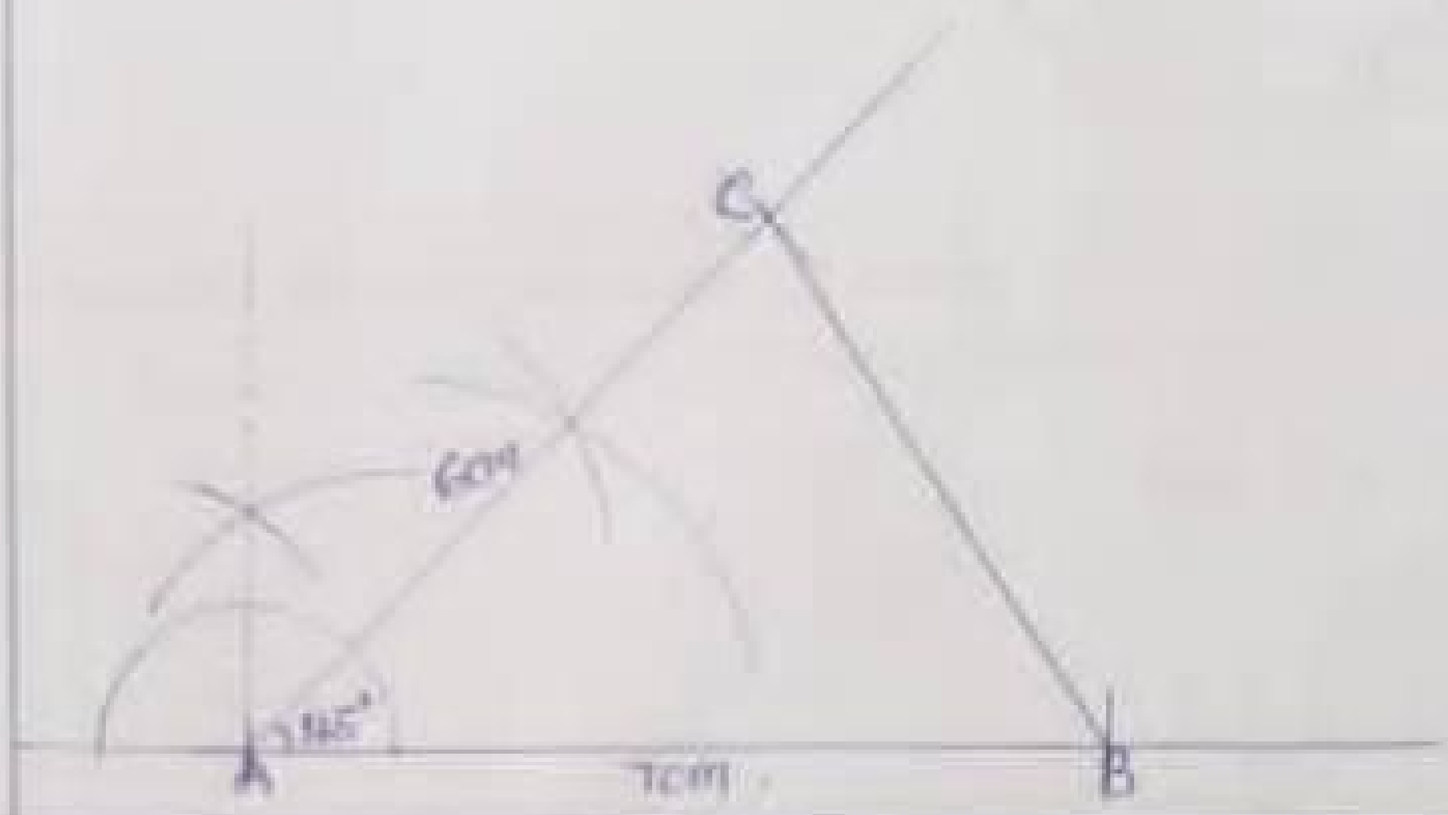
Turn Over

26. (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°.

(04 marks)

Sketch



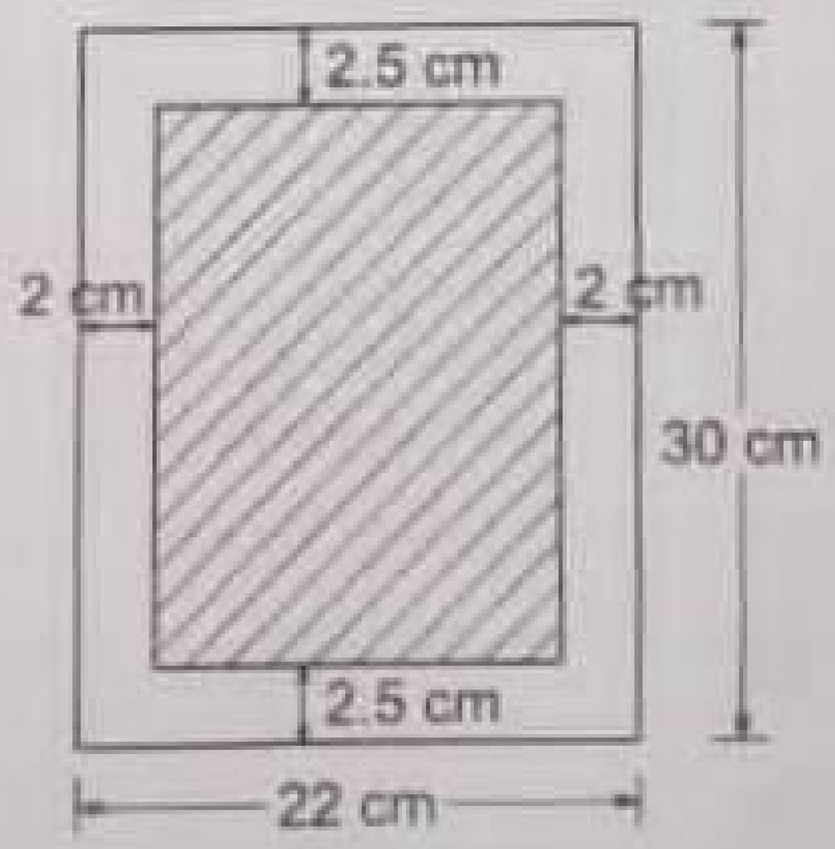


(b) Measure angle ACB.

(01 mark)

∠ACB = 77°

27. 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)

Length = 30cm − (2·5cm + 2·5cm)

Length = 30cm − 5cm

Length = 25cm

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

Area of the frame

$A = L \times W$

$A = 30cm \times 22cm$

$A = 660cm^2$

220 × 3 = 660

Area of the photo

$A = L \times W$

But Width

$W = 22cm - (2cm + 2cm)$

$W = 22cm - 4cm$

$W = 18cm$

$A = L \times W$

$A = 25cm \times 18cm$

$A = 450cm^2$

25 × 18 = 200, +25 = 450

Area of the frame not covered by the photo

$660cm^2 - 450cm^2$

$210cm^2$

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)*

Let y be the cost of an exercise book.

book	Set
y	y + sh 2000

2books = a set.

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

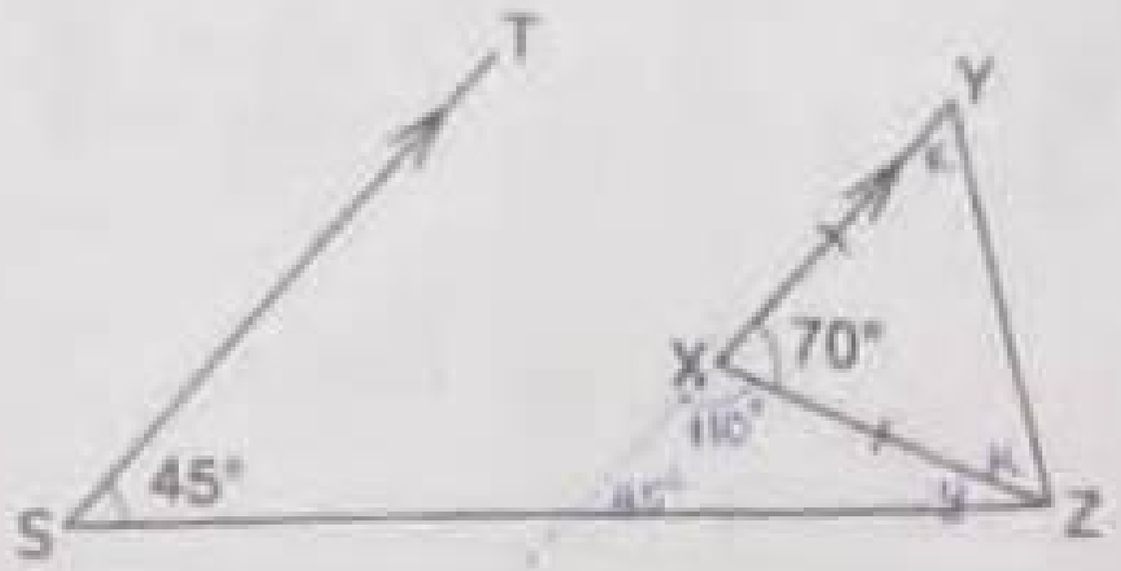
$5y = y + sh\ 2000$

$5y - y = y - y + sh\ 2000$

$\frac{4y}{4} = \frac{sh\ 2000}{4}$

$y = sh\ 500$

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



Find the size of angle;

(a) XYZ (02 marks)

Let ∠XYZ be k

k + k + 70° = 180°

2k + 70° = 180°

2k + 70° − 70° = 180° − 70°

$\frac{2k}{2} = \frac{110°}{2}$

k = 55°

(b) SZX (03 marks)

let ∠SZX be y

180° − 155° = 25°

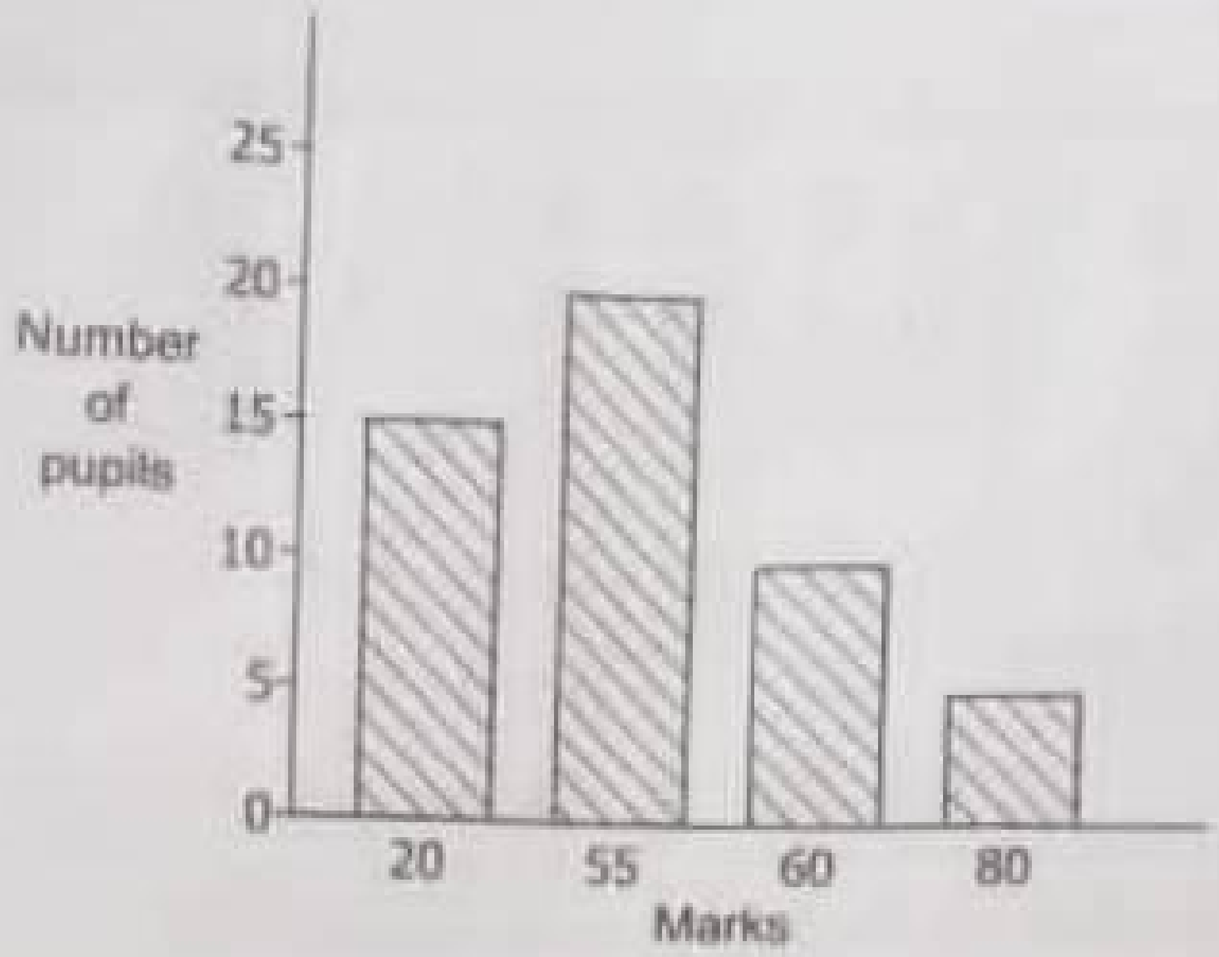
y + 110° + 45° = 180°

y + 155° = 180°

y + 155° − 155° = 180° − 155°

y = 25°

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)*

15 + 20 + 10 + 5

50 pupils.

(b) Calculate the mean mark of the pupils. *(03 marks)*

$$\text{Mean} = \frac{\text{Sol}}{\text{NO1}}$$

$$\text{Mean} = \frac{(20\times15)+(55\times20)+(60\times10)+(80\times5)}{50}$$

$$\text{Mean} = \frac{300+1100+600+400}{50}$$

$$\text{Mean} = \frac{2400}{50}$$

Mean = 48 marks.

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
4 : 6 : 5

Total ratio:
4 + 6 + 5 = 15

Difference in ratio
G - F
6 - 4 = 2

2 parts rep 72 books
1 part rep $\frac{36}{72}$ books
$\frac{2}{2}$
36 books.

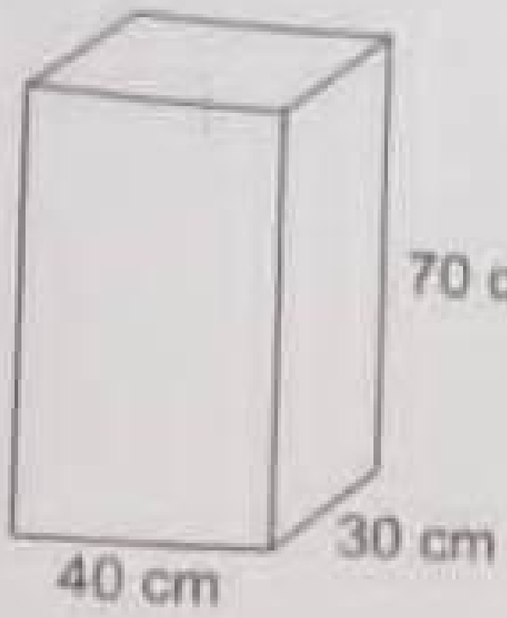
15 parts rep 36 x 15 books
540 books.
∴ The company supplied 540 text books.

$\begin{array}{r} 36 \\ \times 15 \\ \hline 180 \\ +360 \\ \hline 540 \end{array}$

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

5 parts rep 36 books
$\times 5$
180 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)*

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

Capacity = $\frac{L \times W \times H}{1000cm^3}$.

Capacity = $\frac{40cm \times 30cm \times 70cm}{1000 cm^3}$.

Capacity = $\frac{12cm^3 \times 7cm}{1cm^3}$

Capacity = $\frac{84cm^3}{1cm^3}$

Capacity = 84 litres.

(b) Calculate;

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

1 hour → 1.5 litres.

12 hours → $(\frac{3}{2} \times \frac{6}{12})$ litres.

18 litres.

(ii) the height of the water that remains in the tank after 12 hours. *(03 marks)*

Capacity of the tank after 12 hours.

84 litres

− 18 litres.

66 litres.

The height of water that remains

66 litres × 70cm / 84 litres

11 × 5cm = 55cm.

END