



SUREKEY EXAMINATIONS BOARD  
PRE-PLE LOWER SERIES (MOSCOW)  
2024  
MATHEMATICS

*Time Allowed: 2 hours 30 minutes*

Index No.	Random No.	Personal No.

Candidate's Name: ..... T.R.FRANCIS .....

Candidate's Signature: MARKING GUIDE .....

School Name: 0764782284/0789065893 .....

District Name: .....

**Read the following instructions carefully:**

- 1. Do not forget to write your school and district name 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 16 printed pages altogether.
- 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 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 easily be read 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		
<b>TOTAL</b>		

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**SECTION A: 40 MARKS**

Answer all questions in this Section  
Questions 1 to 20 carry two marks each

1. Workout:  $124 \div 4$ .

$$\begin{array}{r} 31 \\ 124 \\ \hline 4 \\ \hline 1 \end{array}$$

$$\therefore 124 \div 4 = 31$$

2. Write "One hundred thousand, one hundred nine" in figures.

One hundred thousand = 100,000

One hundred nine = 109

$$\underline{\underline{100,109}}$$

3. Given that  $Q = \{ \text{all prime numbers less than } 10 \}$ . Calculate the number of proper subsets in Set Q.

$$Q = \{ 2, 3, 5, 7 \}$$

$$n(Q) = 4$$

$$\text{Proper subsets} = 2^n - 1$$

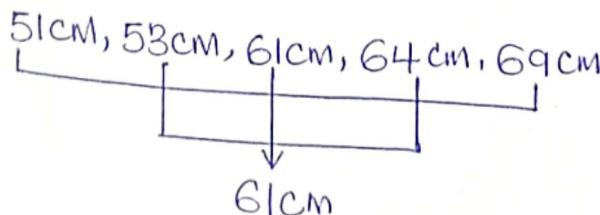
$$= 2^4 - 1$$

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

$$= 16 - 1$$

$$= 15 \text{ Proper subsets}$$

4. The following lengths of five trees in a school compound were recorded during an environment survey; 51cm, 69cm, 53cm, 61cm and 64cm. Find the median length of the trees.



$$\therefore \text{Median} = 61 \text{ cm}$$

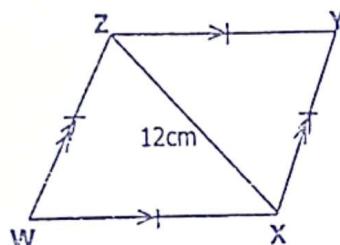
5. Calculate the highest number of children that can share either 18 or 24 rulers leaving no remainder.

2	18	24
3	9	12
	3	4

$2 \times 3$   
6 children



6. The area of the figure below is  $90\text{cm}^2$ .



Find the length of the diagonal WY.

$$\frac{d_1 \times d_2}{2} = \text{Area}$$

$$\frac{12\text{cm} \times WY}{2} = 90\text{cm}^2$$

$$12\text{cm} \times WY = 180\text{cm}^2$$

$$\frac{180\text{cm} \times WY}{12\text{cm}} = \frac{90\text{cm} \times 2}{6\text{cm}}$$

$$WY = \frac{90\text{cm}}{6}$$

$$WY = 15\text{cm}$$

7. Simplify:  $5a - 3(2 + a)$

$$5a - 3(2 + a)$$

$$5a - 6 - 3a$$

$$5a - 3a - 6$$

$$2a - 6$$

8. Find the next number in the sequence below.

$$1, 2, 5, 11, 21, 36, \underline{\hspace{2cm}} \dots$$

+1    +3    +6    +10    +15    +21

9. Harriet had 5 packets of yoghurt each weighing 2500ml. Find the weight of the packets in litres.

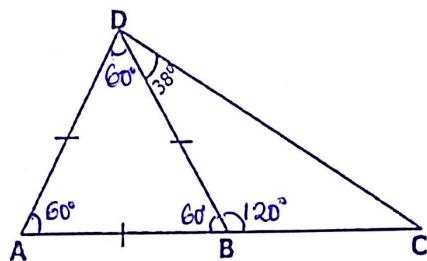
Total weight in ml

$$\begin{array}{r} 2500 \text{ ml} \\ \times 5 \\ \hline 12500 \text{ ml} \end{array}$$

$$1 \text{ ml} = \frac{1}{1000} \text{ L}$$

$$\begin{aligned} 12500 \text{ ml} &= \left( \frac{1}{1000} \times 12500 \right) \text{ L} \\ &= \left( \frac{125}{10} \right) \text{ L} \\ &= 12.5 \text{ L} \end{aligned}$$

10. In the figure below,  $ABC$  is a straight line,  $ABD$  is an equilateral triangle.



Find the size of angle  $BCD$  in degrees.

$$BCD + 120^\circ + 38^\circ = 180^\circ$$

$$BCD + 158^\circ = 180^\circ$$

$$BCD + 158^\circ - 158^\circ = 180^\circ - 158^\circ$$

$$\underline{\underline{BCD = 22^\circ}}$$



11. A water tank was  $\frac{2}{3}$  full of water, before  $\frac{1}{3}$  of it was sold by the owner.

What fraction remained after selling some water?

Fraction sold

$$\frac{1}{3} \text{ of } \frac{2}{3}$$

$$\frac{1}{3} \times \frac{2}{3}$$

$$\frac{2}{9}$$

Fraction left

$$\frac{2}{3} - \frac{2}{9}$$

$$\frac{6-2}{9}$$

$$\frac{4}{9}$$

12. Convert 4600 square centimetres to square metres.

$$4600 \text{ cm}^2 \text{ to m}^2$$

$$1 \text{ m} = 100 \text{ cm}$$

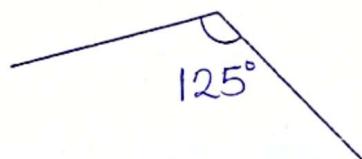
$$1 \text{ m}^2 = (100 \times 100) \text{ cm}^2$$

$$1 \text{ m}^2 = 10000 \text{ cm}^2$$

$$1 \text{ cm}^2 = \frac{1}{10000} \text{ m}^2$$

$$\begin{aligned} 4600 \text{ cm}^2 &= \frac{1}{10000} \times 4600 \text{ m}^2 \\ &= \frac{46}{100} \text{ m}^2 \\ &= 0.46 \text{ m}^2 \end{aligned}$$

13. Use a protractor to measure the size of the angle below.



14. Express  $12\frac{1}{2}\%$  as a common fraction in the simplest form.

$$12\frac{1}{2}\%$$

$$\frac{25}{2} \times \frac{1}{100}$$

$$12\frac{1}{2} \div 100$$

$$\frac{25}{2} \times \frac{1}{100}$$

$$\frac{25}{2} \div 100$$

$$\frac{1}{8}$$

15. Suzan bought 6 heaps of mangoes at Sh.7,200. How many heaps would she buy for Sh.4,800. For the same type of mangoes?

6 heaps  $\rightarrow$  sh. 7200

1 heap  $\rightarrow$  sh. 7200



$$\begin{aligned} \text{No. of heaps} &= \frac{\text{sh. } 4800}{\text{sh. } 1200} \\ &= \frac{4}{5} \\ &= 4 \text{ heaps} \end{aligned}$$

Turn Over

16. A car covered a distance of 880cm in four revolutions. Calculate the diameter of the car wheel.

(Use  $\pi$  as  $\frac{22}{7}$ )

$$\frac{\text{Distance}}{\text{Circumference}} = \text{No of revolution}$$

$$\frac{880\text{cm}}{C} = 4$$

$$C \times \frac{880\text{cm}}{C} = 4 \times C$$

$$\frac{4C}{4} = \frac{880\text{cm}}{4}$$

$$C = 220\text{cm}$$

$$\pi D = C$$

$$\frac{22}{7}D = 220\text{cm}$$

$$7 \times \frac{22D}{7} = 220\text{cm} \times 7$$

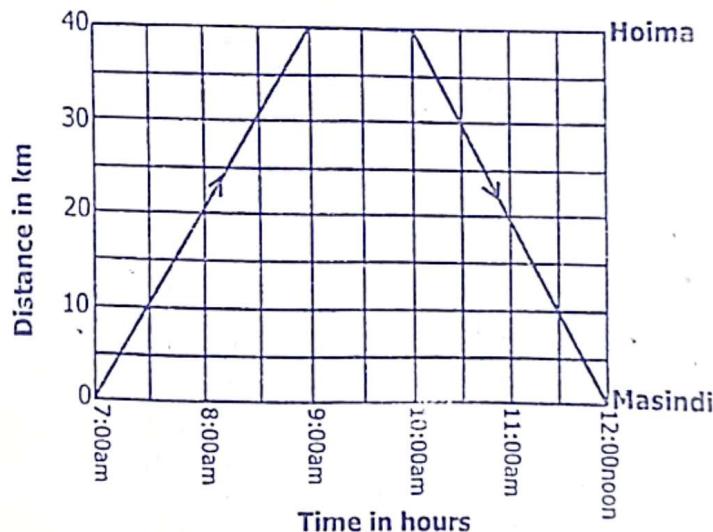
$$22D = 220\text{cm} \times 7$$

$$22D = 22 \times 22$$

$$D = 100\text{cm} \times 7$$

$$D = 70\text{cm}$$

17. The graph below shows a driver's journey from Masindi to Hoima and back to Masindi.



Calculate the driver's average speed for the whole journey.

$$\text{Total distance covered} = 40\text{km} + 40\text{km} \\ = 80\text{km}$$

$$A.S = \frac{TDC}{TTT}$$

$$A.S = \frac{80\text{km}}{5\text{hr}}$$

$$A.S = 16\text{km/hr}$$

$$\text{Total time taken} = \begin{array}{r} \text{HRS} \quad \text{MINS} \\ 12 \quad 00 \\ - 7 \quad 00 \\ \hline 5 \quad 00 \\ 5 \text{hours} \end{array}$$

18. Write 949 in Roman Numerals.

900	40	9
CM	XL	IX

$$\underline{949 = CMXLIX}$$

19. Solve:  $3^{3n} \div 3^n = 81$ .

$$\begin{array}{l|l} 3^{3n} \div 3^n = 81 & 2n = 4 \\ 3^{3n-n} = 3^4 & \frac{2}{2} \\ 3^{2n} = 3^4 & h = 2 \\ 2n = 4 & \end{array}$$

3	81
3	27
3	9
3	3
3	1

3<sup>4</sup>

20. The distance on a map between the school Kitchen and the Main Hall is 12cm. Find the actual ground distance in kilometres, between the two places using a scale of 1:50,000.

1cm rep 50,000cm

12cm rep  $(50,000 \times 12)$  cm



600,000 cm

Km	Hm	Dm	M	dm	Cm	mm
1	0	0	0	0	0	0

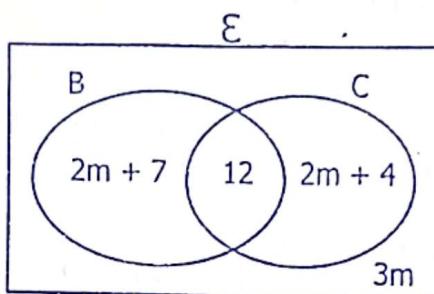
$$1\text{cm} = \frac{1}{100000}\text{km}$$

$$\begin{aligned} 600,000\text{cm} &= \left( \frac{1}{100,000} \times 600,000 \right) \text{km} \\ &= 6\text{km} \end{aligned}$$

**SECTION B: 60 MARKS**Answer **all** questions in this section

Marks for each question are indicated in brackets.

21. At a birthday party, Biscuits (B) and Cakes (C) were served as shown in the Venn diagram below.



- (a) If 19 guests were not served with biscuits, find the value of m.

$$\begin{array}{l|l} 3m + 2m + 4 = 19 & 15m = 15 \\ \hline 5m + 4 = 19 & \frac{5}{5} \\ 5m + 4 - 4 = 19 - 4 & \underline{m = 3} \\ \hline 5m = 15 & \end{array} \quad (02 \text{ Marks})$$

- (b) Find the total number of guests that attended the party. (02 Marks)

$$\begin{aligned} & (2m+7) + 12 + (2m+4) + 3m \\ & (2 \times 3 + 7) + 12 + (2 \times 3 + 4) + 3 \times 3 \\ & 6 + 7 + 12 + 10 + 9 \\ & \underline{\underline{44 \text{ guests}}} \end{aligned}$$

- (c) Find the probability that a guest picked at random did not take any of the two eats.

$$\begin{array}{l|l} n(B \cup C)^c = 3m & P = \frac{9}{44} \\ \hline & (01 \text{ Mark}) \\ & = 3 \times 3 \\ & = 9 \end{array}$$

22. (a) Write the place value of 3 in  $431_{\text{five}}$ . (01 Mark)

$431_{\text{five}}$   
| Fives

- (b) Find the value of 4 in (a) above. (02 Marks)

$5^2$	$5^1$	$5^0$
4	3	1

$$\begin{array}{r} 4 \times 5^2 \\ 4 \times 5 \times 5 \\ \hline 100 \end{array}$$

- (c) Workout:  $101_{\text{two}} \times 11_{\text{two}}$ . (02 Marks)

$$\begin{array}{r} 101_{\text{two}} \\ 11_{\text{two}} \\ \hline + \\ \hline 101 \\ \hline 1111_{\text{two}} \end{array}$$



23. In a Mathematics test, 4 pupils scored 40 marks, 3 pupils scored 70 marks, 2 pupils scored 60 marks and the best pupil scored 90 marks.

- (a) Workout the modal mark. (01 Mark)

Marks	Freq
40	4
70	3
60	2
90	1

Modal mark = 40 Marks

- (b) Calculate the mean mark of the test. (03 Marks)

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

$$\text{Mean} = \frac{(40 \times 4) + (70 \times 3) + (60 \times 2) + (90 \times 1)}{4 + 3 + 2 + 1}$$

$$= \frac{160 + 210 + 120 + 90}{10}$$

$$= \frac{580}{10}$$

$$= 58 \text{ marks}$$

Turn Over

22. (a) Write the place value of 3 in  $431_{\text{five}}$ . (01 Mark)

$431_{\text{five}}$   
| Fives

- (b) Find the value of 4 in (a) above. (02 Marks)

$$\begin{array}{|c|c|c|} \hline 5^2 & 5^1 & 5^0 \\ \hline 4 & 3 & 1 \\ \hline \end{array} \quad \begin{array}{l} 4 \times 5^2 \\ 4 \times 5 \times 5 \\ \hline 100 \end{array}$$

- (c) Workout:  $101_{\text{two}} \times 11_{\text{two}}$ . (02 Marks)

$$\begin{array}{r} 101_{\text{two}} \\ 11_{\text{two}} \\ \hline + \\ \hline 101 \\ \hline 1111_{\text{two}} \end{array}$$



23. In a Mathematics test, 4 pupils scored 40 marks, 3 pupils scored 70 marks, 2 pupils scored 60 marks and the best pupil scored 90 marks.

- (a) Workout the modal mark. (01 Mark)

Marks	Freq
40	4
70	3
60	2
90	1

Modal mark = 40 Marks

- (b) Calculate the mean mark of the test. (03 Marks)

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

$$\text{Mean} = \frac{(40 \times 4) + (70 \times 3) + (60 \times 2) + (90 \times 1)}{4 + 3 + 2 + 1}$$

$$= \frac{160 + 210 + 120 + 90}{10}$$

$$= \frac{580}{10}$$

$$= 58 \text{ marks}$$

Turn Over

24. The table below shows how a cyclist travelled from Iganga to Kampala.

Town	Arrival time	Departure time
Iganga	.....	9:45a.m
Lugazi	10:30a.m	10:45a.m
Mukono	11:45a.m	12:00 noon
Kampala	1:15p.m	.....

(a) Express the arrival time to Kampala in the 24-hour clock system.

$$\begin{array}{r}
 01:15 \\
 12:00 \\
 \hline
 1315 \text{ Hrs}
 \end{array}
 \quad (01 \text{ Mark})$$

(b) Find the time the cyclist took to travel from Lugazi to Kampala.

$$\text{Duration} = \text{Arr.Time} - \text{Departure time}$$

Arr.Time	Dept Time	HRS	MINS
1315 Hrs	1045 Hrs	13	15 + 60
		- 10	- 45
		2	30

$$\begin{array}{r}
 15 + 60 \\
 - 45 \\
 \hline
 30
 \end{array}
 \quad 2\frac{1}{2} \text{ hours}$$

(c) If the distance between Lugazi to Kampala is 210km, calculate the average speed of the cyclist for the whole journey. (02 Marks)

$$T = T_1 + T_2 = 2\frac{1}{2} \text{ hrs}$$

$$TDC = 210 \text{ km}$$

$$A.S = \frac{TDC}{T}$$

$$= 210 \text{ km} \div 2\frac{1}{2} \text{ hr}$$

$$= 210 \text{ km} \div \frac{5}{2} \text{ hr}$$

$$= 210 \text{ km} \times \frac{2}{5}$$

$$= 84 \text{ km/hr}$$

10

25. Peter, Ronald and Faith shared some books in the ratio of 2:3:5 respectively. If Faith got 30 more books than Ronald;

- (a) Find the total number of books shared by the three children.

Peter	Ronald	Faith	Total
2	3	5	10

(03 Marks)

Total No of books

$$10 \text{ parts} \times 15$$

$$\underline{150 \text{ books}}$$

$$5-3 = 2 \text{ parts}$$

2 parts rep 30 books

$$1 \text{ part rep } \frac{30}{2} \text{ books}$$

$$15 \text{ books}$$

- (b) Express Faith's share as a percentage of the total share.

(02 Marks)

Faith

$$5 \times 15$$

$$75 \text{ books}$$

$$\frac{75}{150} \times 100\%$$

$$25\%$$

$$\frac{75}{150} \times \frac{2}{10} \times 100\%$$

$$15\%$$

$$3\%$$

$$25 \times 2$$

$$50\%$$

26. In a school of 1200 pupils,  $\frac{2}{3}$  are boys and the rest are girls. If 40% of the girls and  $12\frac{1}{2}\%$  of the boys are boarders, how many pupils are in boarding altogether?

(05 Marks)

No of boys

$$\frac{2}{3} \times 1200$$

\$

$$800 \text{ boys}$$

Boys that are Boarders

$$12\frac{1}{2} \times 800$$

100

$$12\frac{1}{2} \div 100 \times 800$$

$$\frac{25}{2} \times \frac{1}{100} \times 800$$

1%

$$100 \text{ boys}$$

No of girls

$$1200$$

$$- 800$$

$$400$$

Girls that are Boarders

$$\frac{40}{100} \times 400$$

100

$$160 \text{ girls}$$

Total No of boarders

$$100$$

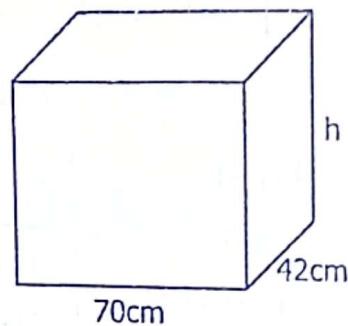
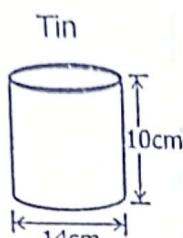
$$+ 160$$

$$\underline{260 \text{ pupils}}$$



Turn Over

27. Small cylindrical tins of diameter 14cm and height 10cm were packed in rectangular box of length 70cm and width 42cm as shown below.



- (a) Calculate the area of the lid used to cover the tin. (Use  $\pi$  as  $\frac{22}{7}$ )

$$A = \pi r^2 \quad (02 \text{ Marks})$$

$$A = \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm}$$

$$A = 22 \text{ cm} \times 7 \text{ cm}$$

$$\underline{A = 154 \text{ cm}^2}$$

- (b) If 90 tins were packed in the box, find the height (h) of the box.

$$\frac{L}{D} \times \frac{W}{D} \times \frac{H}{h} = 90 \text{ tins} \quad (03 \text{ Marks})$$

$$\frac{70 \text{ cm}}{14 \text{ cm}} \times \frac{42 \text{ cm}}{14 \text{ cm}} \times \frac{H}{10 \text{ cm}} = 90 \text{ tins}$$

$$\frac{\frac{5}{2} \times 3 \times h}{10 \text{ cm}} = 90 \text{ tins}$$

$$2.5 \times \frac{3h}{2 \text{ cm}} = (90 \text{ tins}) \times 2 \text{ cm}$$

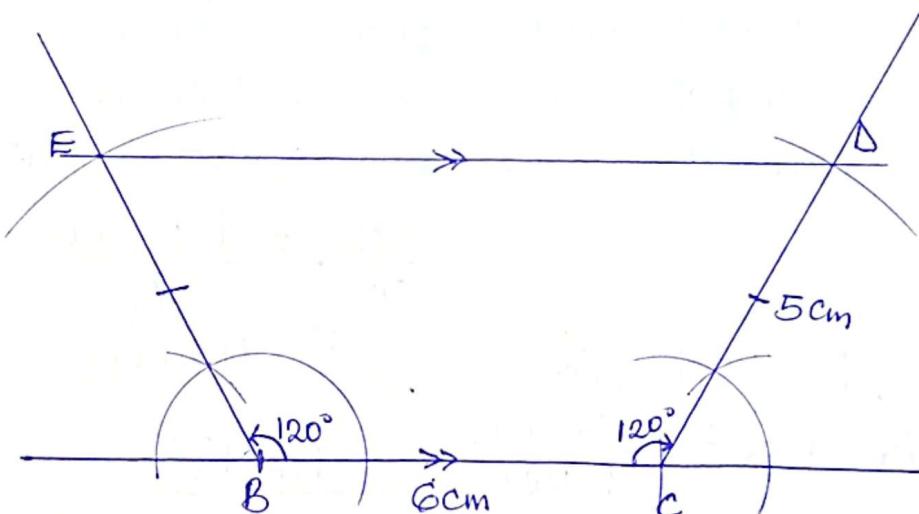
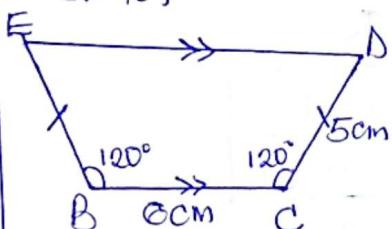
12

$$\frac{3h}{2} = 180 \text{ cm}$$

$$\underline{h = 60 \text{ cm}}$$

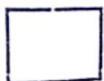
28. (a) Using a ruler, a pencil and a pair of compasses only, construct a quadrilateral BCDE where  $BC = 6\text{cm}$ ,  $CD = BE = 5\text{cm}$  and angle  $BCD = CBE = 120^\circ$ . (05 Marks)

Sketch



Measure length ED. .... 10.9 cm

(01 Mark)



29. A trouser, a belt and a shirt cost Sh.50,000 altogether. A trouser costs 5 times as much as a shirt, a shirt costs Sh.6,000 more than a belt. How many belts can be bought with Sh.10,000? (05 Marks)

Let the cost of a belt be  $K$

Belt	Shirt	Trouser	Total
$K$	$K + \text{Sh.}6,000$	$5(K + \text{Sh.}6,000)$	$\text{Sh.}50,000$

$$K + K + \text{Sh.}6,000 + 5(K + \text{Sh.}6,000) = \text{Sh.}50,000$$

$$K + K + \text{Sh.}6,000 + 5K + 30,000 = \text{Sh.}50,000$$

$$K + K + 5K + \text{Sh.}6,000 + \text{Sh.}30,000 = \text{Sh.}50,000$$

$$7K + \text{Sh.}36,000 = \text{Sh.}50,000$$

$$7K + \text{Sh.}36,000 - 36,000 = \text{Sh.}50,000 - \text{Sh.}36,000$$

$$\frac{7K}{7} = \frac{\text{Sh.}14,000}{7}$$

$$K = \underline{\underline{\text{Sh.}2,000}}$$

$$\text{No of belt} = \frac{\text{Sh.}10,000}{\text{Sh.}2,000} = \underline{\underline{5 \text{ belts}}}$$

30. An Estate Company fenced a circular piece land of diameter 56 metres using poles and two lines of barbed wire.

- (a) Find in metres, the length of the barbed wire that was used to fence the piece of land. (Use  $\pi$  as  $\frac{22}{7}$ ) (02 Marks)

$$C = \pi D$$

$$C = \frac{22}{7} \times \frac{8}{56} \text{ m}$$

$$C = 22 \times 8 \text{ cm}$$

$$C = 176 \text{ cm}$$

Total length of barbed

wire:

$$(2 \times 176) \text{ m}$$

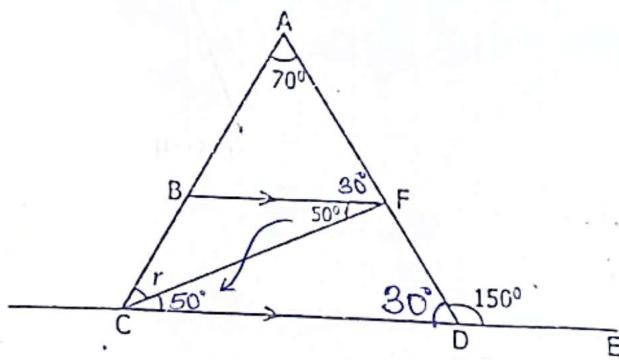
$$\underline{\underline{352 \text{ m}}}$$

- (b) If the poles were fixed 800cm apart, find the number of poles that were used to fence the piece of land. (03 Marks)

$$\begin{aligned} C &= 176 \text{m} \\ 1 \text{m} &= 100 \text{cm} \\ 176 \text{m} &= (176 \times 100) \text{cm} \\ &= 17600 \text{cm} \end{aligned}$$

$$\begin{aligned} \text{No of poles} &= \frac{\text{Circumference}}{\text{Interval}} \\ &= \frac{17600 \text{cm}}{800 \text{cm}} \\ &= \underline{\underline{22 \text{poles}}} \end{aligned}$$

31. In the diagram below, line BF is parallel to line CE. Study it carefully and answer the questions that follow.



- (a) Find the value of  $r$ .

(02 Marks)

$$r + 50^\circ + 30^\circ + 70^\circ = 180^\circ$$

$$r + 150^\circ = 180^\circ$$

$$r + 150^\circ - 150^\circ = 180^\circ - 150^\circ$$

$$r = 30^\circ$$

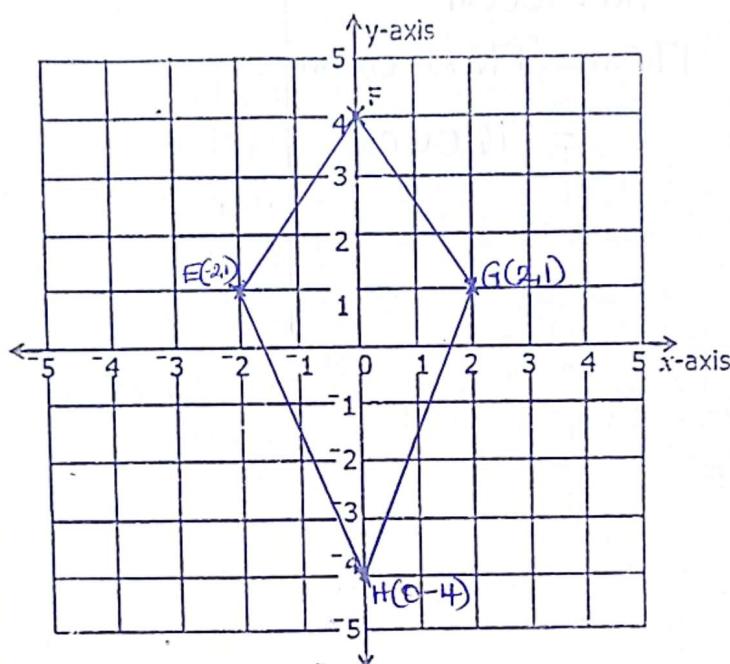
- (b) Calculate the size of angle marked  $\angle AFB$ .

(02 Marks)

$\angle AFB = 30^\circ$  (Corresponding angles)

32. On the Cartesian plane below,

- (a) Plot the points,  $E(-2, 1)$ ,  $G(2, 1)$  and  $H(0, -4)$ . (03 Marks)



- (b) Write down the coordinates of point  $F$ . (01 Mark)

$F(0, 4)$

- (c) What geometric figure is formed when  $E$  is joined to  $F$ ,  $E$  to  $H$ ,  $H$  to  $G$  and  $F$  to  $G$ ? (02 Marks)

Kite

