

SECTION A: 40 MARKS

Answer **all** the questions in this section

Questions 1 to 20 carry two marks each

1. Work out: $473 + 312$

$$\begin{array}{r} 473 \\ + 312 \\ \hline 785 \end{array}$$

2. Write 27,040 in words.

Twenty seven thousand forty

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

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

$$\frac{n(n+1)}{2}$$

$$\frac{3(3+1)}{2} = \frac{3 \times 4}{2} = 6$$

$$\frac{n(n+1)}{2}$$

$$\frac{4(4+1)}{2} = \frac{4 \times 5}{2} = 10$$

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

$$\text{No. of subsets} = 2^n$$

$$n(Q) = 2.$$

$$\begin{array}{r} 2 | 4 \\ 2 | 2 \\ 1 \end{array}$$

$$= 2^n$$

$$\frac{2^2}{2} = \frac{2^n}{2}$$

$$n = 2 \text{ elements.}$$

5. Write 5,834 in standard form.

$$5834$$

$$583.4 \div 10$$

$$58.34 \div 10$$

$$5.834 \div 10$$

$$5.834 \times 10^3$$

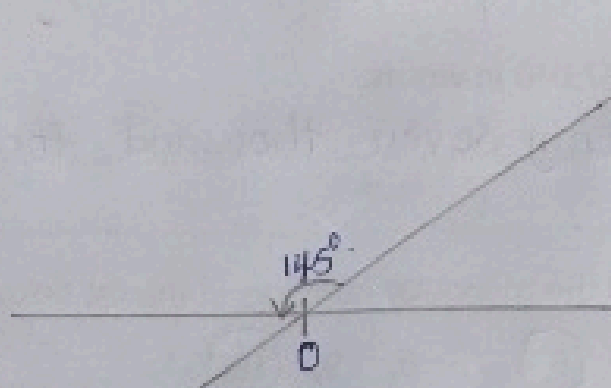
6. A taxi left Kampala for Gulu at 10:00 p.m. The journey took 5 hours. What time did the taxi arrive in Gulu?

Ending time = Duration + Starting time

| Time before midnight | | Duration | | Starting time | | Remaining time | | To 12 hour clock | | End time | |
|----------------------|-----|----------|-----|---------------|-----|-----------------|-------|------------------|-----|----------|-----|
| Hrs | Min | Hrs | Min | Hrs | Min | Hrs | Min | Hrs | Min | Hrs | Min |
| 12 | 00 | 5 | 00 | 10 | 00 | 5 hrs - 2 hrs | 3 hrs | 12 | 00 | 00 | 00 |
| 10 | 00 | +10 | 00 | 20 | 00 | 2 hrs to 24 hrs | 2 hrs | 3 | 00 | 3 | 00 |
| 2 | 00 | | | 15 | 00 | +12.00 | 00 | | | 3 | 00 |
| | | | | | | +12.00 | 00 | | | | |
| | | | | | | 00 | 00 | | | | |

3:00 am

7. Using a protractor and a ruler, draw an angle of 145° in the space below.



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

$$\frac{m \times n}{n - r} = \frac{5 \times 3}{3 - (-2)} = \frac{15}{3 + 2} = \frac{15}{5} = 3$$

9. Change 9.85 kilogrammes into grammes.

$$\begin{aligned} 1 \text{ kg} &\rightarrow 1000 \text{ g} \\ 9.85 \text{ kg} &\rightarrow ? \\ 9.85 \text{ kg} \times 1000 \text{ g} \\ \hline 9850 \text{ g} \end{aligned}$$

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

Total pens.

$$5 + 6$$

$$= 11.$$

$$\text{probability} = \frac{n(\text{Events})}{S. \text{Space.}}$$

$$= \frac{5}{11}.$$

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

$$3y = (5+1) \text{ (finite 7)}$$

$$\frac{3y}{3_1} = \frac{1+1}{3_1} \text{ (finite 7)}$$

$$y = 4 \text{ (finite 7)}$$

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

| | | |
|---|----|----|
| 2 | 18 | 30 |
| 3 | 9 | 15 |
| 3 | 3 | 5 |
| 5 | 1 | 5 |
| | 1 | 1 |

$$2 \times 3 \times 3 \times 5$$

$$6 \times 15 = 90$$

13. Work out: $9.8 + 0.07$

$$\frac{98}{10} \div \frac{7}{100}$$

$$\frac{14}{98} \times \frac{100}{7}$$

$$14 \times 10$$

$$140$$

14. Auma sold two cocks for sh 70,000 making a profit of sh 12,000. If both cocks cost the same price, find the price Auma bought each cock.

$$Bp = Sp - P.$$

$$\text{sh } 70,000$$

$$- \text{sh } 12,000$$

$$\hline \text{sh } 58,000$$

2 cocks cost sh 58,000

1 cock cost sh ?

$$a. \frac{1 \text{ cock} \times \text{sh } 58,000}{2 \text{ cocks}}$$

$$\hline$$

$$\text{sh } 29,000.$$

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



$$2a + 7a = 180^\circ$$

(straight line angles)

$$9a = 180^\circ$$

$$a = 20^\circ$$

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.

Total ratio

$$2 + 3 = 5$$

$$\text{Males} = 30$$

$$\frac{2 \text{ males}}{5}$$

$$2 \text{ parts} \rightarrow 30$$

$$5 \text{ parts} \rightarrow ?$$

$$5 \times 30$$

$$= 150$$

workers

Turn Over

17. Solve: $\frac{5}{6}k - 7 = 3$ $k = 2 \times 6$
 $k = 12$

$$\begin{aligned}\frac{5}{6}k - 7 &= 3 \\ \frac{5}{6}k - 7 + 7 &= 3 + 7 \\ \frac{5}{6}k &= 10 \times \frac{6}{5} \\ \frac{5}{\cancel{5}}k &= \frac{10 \times 6}{\cancel{5}} \\ k &= 12\end{aligned}$$

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

$$\begin{aligned}\text{Mean} &= \frac{\text{Total sum}}{\text{Total number}} & \text{Mean} &= 6 \\ &= \frac{4 + 7 + 8 + 5}{4} \\ &= \frac{24}{4}\end{aligned}$$

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

$$\begin{aligned}\text{Circumference} &= \pi d \\ &= \frac{22}{7} \times 70 \\ &= 220 \text{ cm.}\end{aligned}$$

$$\begin{aligned}1 \text{ rev} &= 220 \text{ cm} \\ 2 \text{ rev} &= (2 \times 220 \text{ cm}) \\ &= 440 \text{ cm.}\end{aligned}$$

20. An aeroplane 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.

$$\begin{aligned}\text{Distance} &= \text{Speed} \times \text{Time} \\ &= 260 \text{ km/h} \times \frac{45}{60} \text{ hr} \\ &= \frac{260}{4} \times 3 \text{ hr} \\ &= 65 \text{ km} \times 3 \\ &= 195 \text{ km.}\end{aligned}$$

SECTION B: 60 MARKS

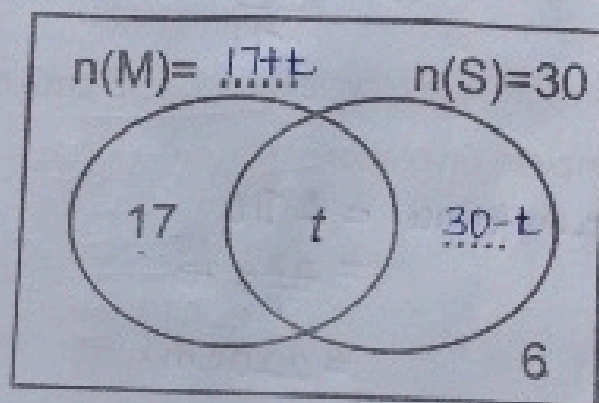
Answer **all** questions in this section

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)

soda only = twice both.

$$30 - t = 2(t)$$

$$30 - t = 2t$$

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

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

$$\frac{10}{1} = \frac{t}{1}$$

$$t = 10 \text{ pupils.}$$

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

(02 marks)

$$n(S) + n(M)_{\text{only}} + 6$$

$$30 + 17 + 6$$

$$36 + 17$$

$$53 \text{ pupils.}$$

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

(04 mark)

103_{five}
 To base ten.
 $(1 \times 5^2) + (0 \times 5^1) + (3 \times 5^0)$
 $(1 \times 5 \times 5) + (0 \times 5) + (3 \times 1)$
 $25 + 0 + 3$
 28_{ten}

To base two

| Base | No. | Rem. |
|------|-----|------|
| 2 | 28 | 0 |
| 2 | 14 | 0 |
| 2 | 7 | 1 |
| 2 | 3 | 1 |

11100_{two}

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

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

(a) How much money will Opio pay for 3 kg of sugar? (02 marks,

2 kg of sugar cost sh. 6800
 3 kg of sugar cost sh. ?
 $3 \text{ kg} \times \text{sh. } 6800$
 $\frac{3 \text{ kg} \times \text{sh. } 6800}{2 \text{ kg}}$
 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?

(03 marks,

| | | |
|--|--|-------------|
| Beans: | 500g cost sh. 1600 | Total: |
| sh. 3000 | 1500g cost sh. ? | sh. 3000 |
| Posho | $1500 \text{ g} \times \text{sh. } 1600$ | + sh. 4800 |
| 1 kg $\rightarrow 1000 \text{ g}$ | $\frac{1500 \text{ g}}{1}$ | + sh. 10500 |
| $\frac{3}{2} \text{ kg} \rightarrow ?$ | sh. 4800 | sh. 18300 |
| $\frac{3}{2} \times \frac{500}{1000}$ | soap: | |
| $\frac{3}{2} \times 1000$ | sh. 10500 | |
| 1500g. | | |

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.

(02 marks)

$$\text{Amount} = \text{Interest} + \text{Principal}$$

$$\text{Interest} = \text{Amount} - \text{Principal}$$

$$\begin{array}{r} \text{sh. } 885,000 \\ - \text{sh. } 750,000 \\ \hline \text{sh. } 135,000 \end{array}$$

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

(03 marks)

$$\text{Time} = \frac{\text{Interest}}{\text{Principal} \times \text{Rate}}$$

$$\text{Time} = \frac{1 \times 1}{1 \times 1}$$

$$= \frac{135,000}{750,000 \times \frac{18}{100}}$$

$$\text{Time} = 1 \text{ year.}$$

$$\begin{array}{r} 750,000 \times \frac{18}{100} \\ = 135,000 \end{array}$$

$$\frac{135,000}{750,000 \times \frac{18}{100}}$$

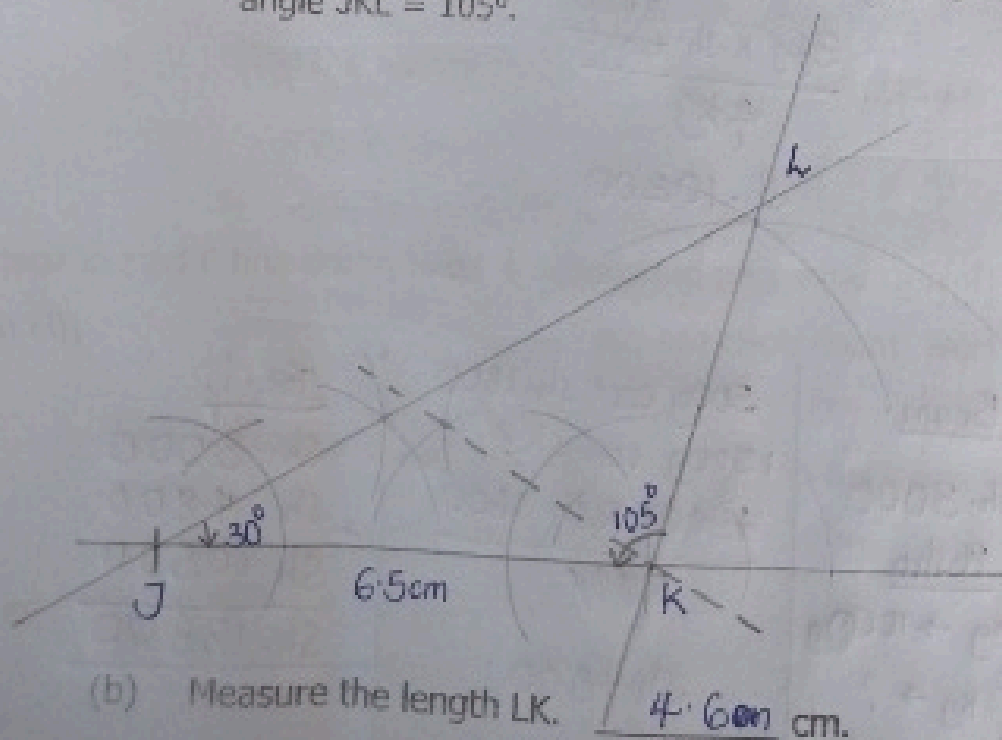
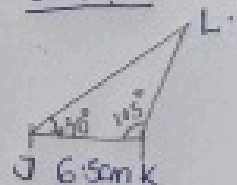


25. Using a ruler and a pair of compasses only,

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

(04 marks)

Sketch



(b) Measure the length LK.

4.6 cm.

(01 mark)

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. (01 mark,

$$\begin{array}{r}
 09\ 30\ \text{hours} \\
 \text{Hrs. Min} \\
 09\ 30 \\
 - 00\ 00 \\
 \hline
 9:30\ \text{am}
 \end{array}$$

- (b) How long did the bus take to travel from Jinja to Kampala? (01 mark,

$$\begin{array}{r}
 \text{Duration} = \text{Ending time} - \text{Starting time} \\
 \begin{array}{r}
 \text{Hrs} \quad \text{Min} \\
 14\ 30 \\
 - 13\ 40 \\
 \hline
 0\ 50
 \end{array}
 \end{array}$$

30+60
= 90-40
= 50
= 50 minutes.

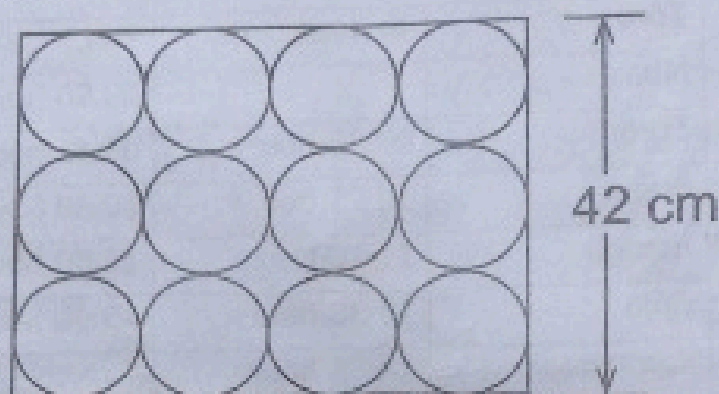
- (c) The distance from Mbale to Kampala is 275 km. Calculate the average speed of the bus for the whole journey. (03 marks)

$$\begin{array}{r}
 \text{Total time} \\
 \text{Hrs} \quad \text{Min} \\
 14\ 30 \\
 - 9\ 00 \\
 \hline
 5\ 30 \\
 5\frac{1}{2}\ \text{hours}
 \end{array}$$

$$\begin{aligned}
 \text{Av. speed} &= \frac{\text{Total distance}}{\text{Total time}} \\
 &= \frac{275\text{km}}{5\frac{1}{2}\text{hours}}
 \end{aligned}$$

$$\begin{aligned}
 &= 275\text{km} \div \frac{11}{2} \\
 &= 275\text{km} \times \frac{2}{11} \\
 &= 25\text{km} \times \frac{2}{1} \\
 &= 50\text{km/hr}
 \end{aligned}$$

27. Lukwago cut out circular cards from a rectangular manilla 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 manilla paper. (02 marks)

$$\begin{array}{l}
 \text{Diameter of} \\
 \text{each card.} \\
 3 \text{ cards} \rightarrow 42 \text{ cm.} \\
 1 \text{ card} \rightarrow ? \\
 \frac{1 \times 42 \text{ cm}}{3} = 14 \text{ cm}
 \end{array}
 \qquad
 \begin{array}{l}
 1 \text{ card} \rightarrow 14 \text{ cm} \\
 4 \text{ card} \rightarrow ? \\
 4 \times 14 \text{ cm} \\
 56 \text{ cm.}
 \end{array}$$

- (b) Calculate the area of the pieces of the manilla paper that remained. (04 marks)

(Use $\pi = \frac{22}{7}$).

Area of manilla.

$$L \times W$$

$$56 \text{ cm} \times 42 \text{ cm}$$

$$2352 \text{ cm}^2$$

Area of one card.

$$\begin{array}{l}
 \pi r^2 \\
 \frac{22}{7} \times \frac{14}{2} \text{ cm} \times \frac{14}{2} \text{ cm} \\
 \frac{22}{7} \times 7 \times 7
 \end{array}$$

$$11 \text{ cm} \times 14 \text{ cm}$$

$$154 \text{ cm}^2$$

$$1 \text{ card} = 154 \text{ cm}^2$$

$$12 \text{ cards} = (12 \times 154 \text{ cm}^2)$$

$$1848 \text{ cm}^2$$

Area that remained (04 marks)

$$\begin{array}{r}
 2352 \text{ cm}^2 \\
 - 1848 \text{ cm}^2 \\
 \hline
 504 \text{ cm}^2
 \end{array}$$

$$= 504 \text{ cm}^2$$

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.

(02 marks)

let the fraction of girls be n .

| Girls | boys | Total |
|-------|-------------------|-------|
| n | $n + \frac{1}{5}$ | 1 |

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

$$2n + \frac{1}{5} = 1$$

$$\text{LCM} = 5$$

$$5 \times 2n + \frac{1}{5} \times 5 = 1 \times 5$$

$$10n + 1 = 5$$

$$10n + 1 - 1 = 5 - 1$$

$$\frac{10n}{10} = \frac{4}{10}$$

$$n = \frac{2}{5}$$

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

(02 marks)

2 part \rightarrow 280 girls

5 parts \rightarrow ?

$$\frac{5 \times 280}{2}$$

$$5 \times 140$$

700 pupils.

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

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

(02 marks)

$$\text{Interior } \angle \text{ sum} = 90(2n - 4)$$

$$1800 = 90(2n - 4)$$

$$1800 = 180n - 360$$

$$n = 12 \text{ sides}$$

$$1800 + 360 = 180n$$

$$\frac{2160}{180} = 12$$

$$12$$

(b) Find the size of each exterior angle of the polygon. (02 marks)

$$\text{No of sides} = \frac{360^\circ}{\text{Ext } \angle}$$

$$\text{Ext } \angle$$

$$\text{Ext } \angle \times 12 = \frac{360^\circ}{\text{Ext } \angle} \times \text{Ext } \angle$$

$$\frac{12 \text{ Ext } \angle}{12} = \frac{360^\circ}{12}$$

$$\text{Ext } \angle = 30^\circ$$

30. A water tank with a 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. (04 marks)

| Fraction remained. | Amount of water in the tank. | Water still remained |
|---|--|---------------------------------|
| $\frac{3}{4} - \frac{1}{6}$ | $\frac{3}{4} \times 4800$ | 1 of 4800L. |
| LCM = 12 | $\frac{3}{4} \times 4800$ | $\frac{1}{6} \times 4800L$ |
| $(\frac{3}{4} \times \frac{3}{3}) - (\frac{1}{6} \times \frac{2}{2})$ | $3 \times 1200L$ | 600L. |
| $\frac{9}{12} - \frac{2}{12}$ | 3600L. | Water sold. |
| $\frac{7}{12}$ | Fraction still remained | 3600L - 600L |
| | $\frac{1}{6} \times \frac{3}{4} = \frac{1}{8}$ | 3000L |

(b) Calculate the amount of money earned from the sale of the water. (02 marks)

1 jerry can \rightarrow 20L.

? \rightarrow 3000L

1 jerry can \times 150

3000

200

150 jerrycans.

1 jerry can \rightarrow sh. 200

150 jerrycans \rightarrow ?

150 jerrycans \times sh. 200

1 jerry can

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.

(04 marks)

Let the cost of a pencil be n.

| book | pencil | Pen |
|------|--------|-------|
| 3n | n | 300+n |

book = pen + pencil.

$$3n = n + 300 + n$$

$$3n = n + n + sh. 300$$

$$3n = 2n + sh. 300$$

$$3n - 2n = sh. 300$$

$$n = sh. 300$$

A book.

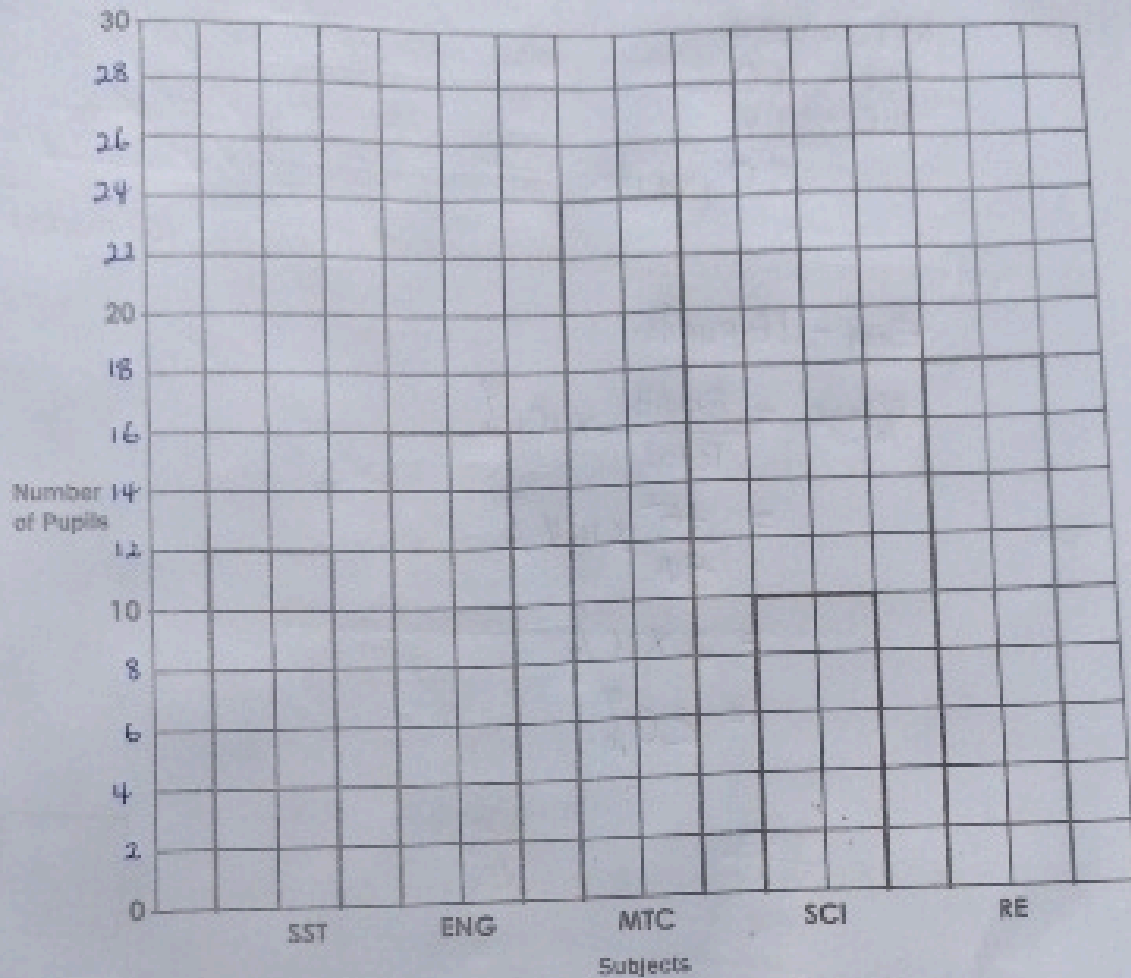
$$3n$$

$$\text{but } n = sh. 300$$

$$3 \times sh. 300$$

$$sh. 900$$

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?

(01 mark)

Science

- (b) How many pupils liked Mathematics best?

(01 mark)

24 pupils.

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

(02 marks)

$$\begin{array}{r} SST - 12 \\ Eng - 16 \\ MTC - 24 \\ Sci - 10 \\ RE - 18 \\ \hline 80 \text{ pupils.} \end{array}$$

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

(02 marks)

Eng - 16 pupils.

$$\begin{aligned} \%age &= \frac{\text{English}}{\text{Total}} \times 100\% \\ &= \frac{16}{80} \times 100\% \\ &= 2 \times 10\% \\ &= 20\% \end{aligned}$$

