



Dr. Blosa Science

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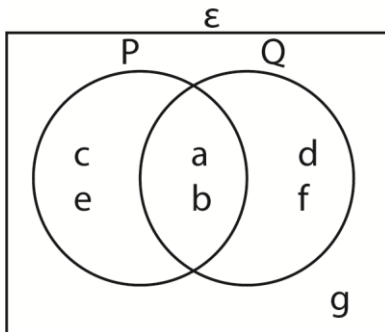


PLE 2016 math marking guide

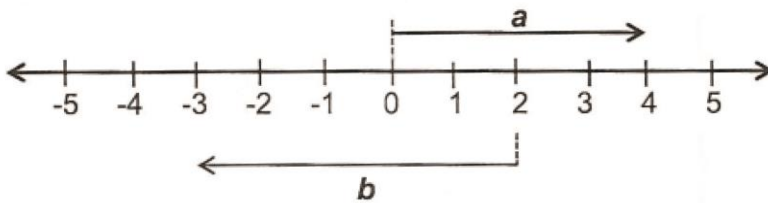
SECTION A: 40 MARKS

Question 1 to 20 carry two mark each

1. Work out  $23 + 42$
2. Simplify  $3a + a - 2a$
3. Work out  $\frac{5}{9} \div \frac{2}{3}$ .
4. Use the Venn diagram to find  $n(P \cap Q)$

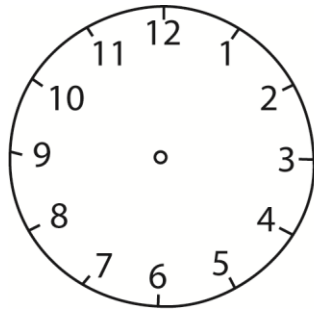


5. Without dividing, show which of the numbers 140 and 5070 is divisible by 3.
6. Work out:  $110_{\text{two}} \times 11_{\text{two}}$ .
7. A die is tossed once. What is the probability that a number less than 5 will appear on top?
8. Write integers represented by a and b on the number line below

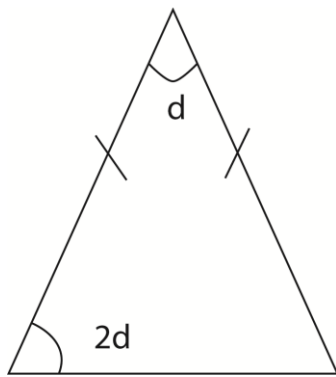


- (i) a .....
- (ii) b .....

9. Show the time “Twenty five minutes to eleven” on the clock face below



10. In the triangle below, find the value of d in degrees.



11. The area of a square flower garden is  $196\text{m}^2$ . Find the length of each side

12. Convert  $12\frac{1}{2}\%$  to fraction in its lowest term.

13. The prime factors of 12 and 90 are given below

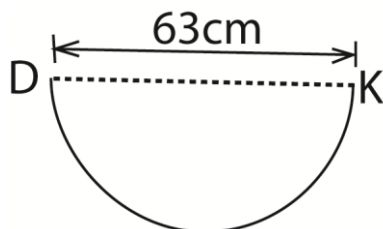
$$12 = 2^2 \times 3$$

$$90 = 2 \times 3^2 \times 5$$

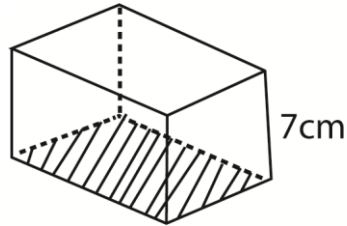
Use the given prime factors above to find the Lowest Common Multiple (LCM) of 12 and 90

14. A wirw of length 161metres was shared by some boys. The average length of wire each boy got was 23metres. Find the number of boys who shared the wire.

15. Find the length of the arc DK in the diagram below (use  $\pi = \frac{22}{7}$ )



16. Apio bought 30 books at 3000 per dozen. How much money did she spend?  
 17. A motorist travels 64km in 40 minutes. Find the speed of the motorist in kilometres per hour.  
 18. The area of the shaded part of the cuboid is  $12\text{cm}^2$ . Calculate the volume of the cuboid.



19. Using a ruler, a pencil and a pair of compasses only construct an angle of  $135^\circ$  in the space below.  
 20. Hakim is three times as old as Lucky. Their total age is 52 years. How old is Lucky?

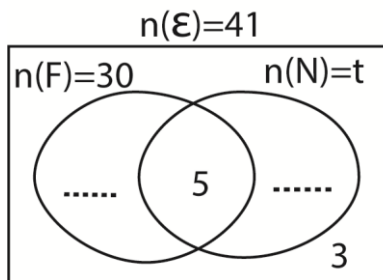
**SECTION B: 60 MARKS**

**Answer all questions in this section**

**Marks for each question are indicated in the brackets**

21. In a class of 41 pupils, 30 play Football (F),  $t$  play netball (N) and 5 play both Football and Netball. 3 pupils do not play any of the two games.

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



- (b) Find the value of  $t$ . (02marks)

22. (a) Write 955 in Roman numerals (01mark)

(b) Find the product of the value of 2 and the the value of 8 in the number 4820  
(04marks)

23. (a) simplify:  $\frac{0.12 \times 5.4}{0.03 \times 0.6}$  (03marks)

(b) Express the recurring decimal 0.5454 ... as a common fraction. (03marks)

24. The exchange rates in a bonk are as follows

1US dollars (\$) = Ug. Sh 3,400

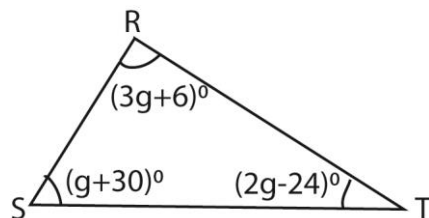
1British Pound Sterling (£)= Ug. Sh4,600

1Kenya shilling (K.sh) = Ug. Sh 35

(a) Convert UG. Sh 1,840,000 to British Pound Sterling. (02marks)

(b) If a set of chairs cost \$700, find the equivalent cost of the chairs in Kenya shillings.  
(03marks)

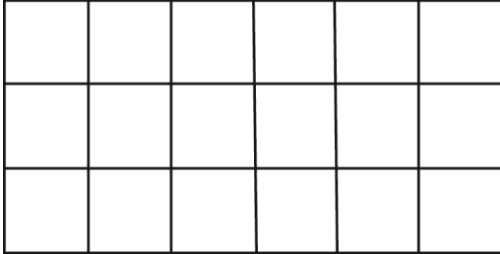
25. Study the figure below and use it to answer the questions that follow.



(a) Find the value of g (03marks)

(b) Calculate the size of angle RST. (01mark)

26. The figure below represents a rectangular floor which is covered by square tiles of area  $400 \text{ cm}^2$  each. Use it to answer the questions that follow.



- (a) Find the area of the rectangular floor. (02marks)
- (b) Calculate the perimeter of the rectangular floor. (04marks)

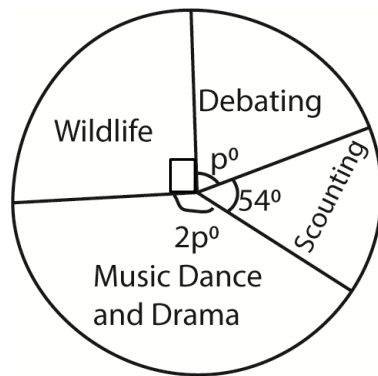
27. A taxi driver left town A for town B at 10.30 a.m. driving at a speed of 80 kilometres per hour. The driver reached town B at 2:00 p.m.

- (a) Calculate the time take by the driver to reach town B.(03marks)
- (b) Find the distance between town A and town B (02marks)

28. Hajat bought 120 shares from a village SACCO at a simple interest rate of 30% per year. Eachsharecosts shs 3,000.

- (a) Find the total interest after  $3\frac{1}{2}$  years. (03marks)
- (b) Calculate the total amount of money Hajati has in the SACCO after  $3\frac{1}{2}$  years (02marks)

29. The pie chart below shows pupils of Mpaata Primary School are distributed in various clubs in the school. Use it to answer the questions that follow.



- (a) There are 216 pupils in the debating club. Find the total number of pupils in the school. (04marks)

(b) Express the number of pupils in the debating club as a percentage of the whole school. (02marks)

30. A cylindrical tank of diameter 70cm contains water to a height of 100cm. find in litres the amount of water the tank contains. (use  $\pi = \frac{22}{7}$ ) (04 marks)

31. (a) Given that  $m = 2k$  and  $k = 5$ , find the value of  $2k + 6m$ . (03marks)

(c) Write the solution set for the inequality:  $6 < x < 10$ . (01mark)

32. A school library is 70 metres east of the main hall. The staff room is 60 metres from the library on a bearing of  $240^\circ$ .

(a) Using a scale of 1cm to represent 10 metres, show the three places on an accurate diagram. (04marks)

(b) Find the shortest distance between the main hall and the staff room.

### Suggested answers

1. Work out  $23 + 42$

**Solution**

$$\begin{array}{r} 23 \\ + 42 \\ \hline 65 \end{array}$$

2. Simplify  $3a + a - 2a$

**Solution**

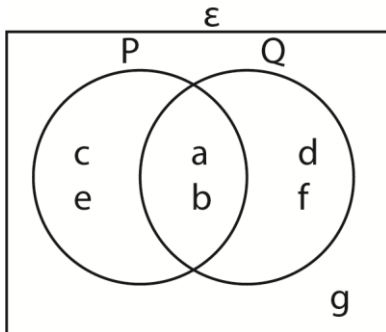
$$\begin{aligned} 3a + a - 2a &= 4a - 2a \\ &= 2a \end{aligned}$$

3. Work out  $\frac{5}{9} \div \frac{2}{3}$ .

**Solution**

$$\begin{aligned} \frac{5}{9} \div \frac{2}{3} &= \frac{5}{\cancel{9}^3} \times \frac{3}{2} \\ &= \frac{5}{6} \end{aligned}$$

4. Use the Venn diagram to find  $n(P \cap Q)'$



**Solution**

$$(P \cap Q)' = \{c, e, d, f, g\}$$

$$n(P \cap Q)' = 5$$

5. Without dividing, show which of the numbers 140 and 5070 is divisible by 3.

**Solution**

Sum of digits in each number

$$140 = 1 + 4 + 0 = 5$$

$$5070 = 5 + 0 + 7 + 0 = 12$$

Since 12 is divisible by 3; 5070 is divisible by 3

6. Work out:  $110_{\text{two}} \times 11_{\text{two}}$ .

**Solution**

$$\begin{array}{r} 110 \\ \times 11 \\ \hline 110 \\ + 110 \\ \hline \underline{\underline{10010}}_{\text{two}} \end{array}$$

7. A die is tossed once. What is the probability that a number less than 5 will appear on top?

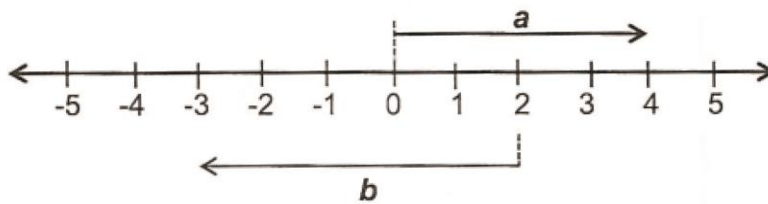
### Solution

Total outcomes (1, 2, 3, 4, 5, 6) = 6

Numbers less than 5 (1, 2, 3, 4) = 4

$$\begin{aligned} \text{Probability of an event happening} &= \frac{\text{Number of ways it can happen}}{\text{Total number of outcomes}} \\ &= \frac{4}{6} = \frac{2}{3} \end{aligned}$$

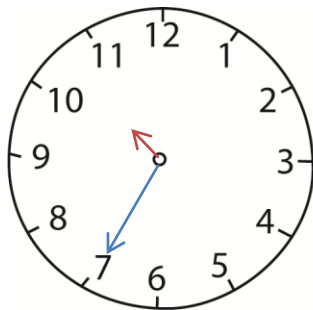
8. Write integers represented by a and b on the number line below



(iii) a: **+4**

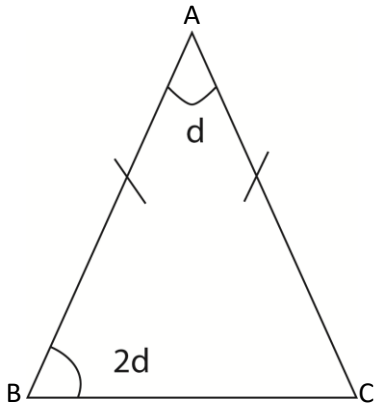
(iv) b: **-5**

9. Show the time “Twenty five minutes to eleven” on the clock face below





10. In the triangle below, find the value of d in degrees.



**Solution**

Since  $AB = AC$ ;  $\angle ABC = \angle ACB = 2d$

$d + 2d + 2d = 180^\circ$  (angle sum of a triangle)

$$5d = 180^\circ$$

$$d = \frac{180^\circ}{5}$$

11. The area of a square flower garden is  $196\text{m}^2$ . Find the length of each side

**Solution**

Let one side =  $x$

$$\text{Area} = x^2 = 196\text{m}^2$$

$$x = \sqrt{196}$$

$$= 14\text{m}$$

12. Convert  $12\frac{1}{2}\%$  to fraction in its lowest term.

**Solution**

$$12\frac{1}{2}\% = \frac{12\frac{1}{2}}{100} = \frac{\frac{25}{2}}{100} = \frac{25}{200} = \frac{1}{8}$$

13. The prime factors of 12 and 90 are given below

$$12 = 2^2 \times 3$$

$$90 = 2 \times 3^2 \times 5$$

Use the given prime factors above to find the Lowest Common Multiple (LCM) of 12 and 90

**Solution**

$$(\text{Prime numbers of 12} \cup \text{Prime number of 12}) = (2^2, 3^2, 5)$$

$$\begin{aligned}\text{Lowest common multiple} &= 2^2 \times 3^2 \times 5 \\ &= 180\end{aligned}$$

14. A wire of length 161 metres was shared by some boys. The average length of wire each boy got was 23 metres. Find the number of boys who shared the wire.

**Solution**

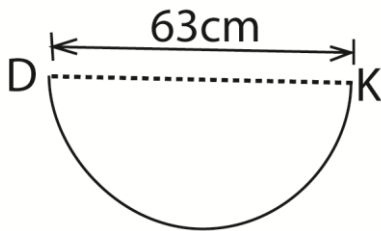
Let the number of boys =  $x$

$$23x = 161$$

$$x = \frac{161}{23} = 7$$

$\therefore$  the number of boys = 7

15. Find the length of the arc DK in the diagram below (use  $\pi = \frac{22}{7}$ )



**Solution**

Circumference of circle =  $\pi d$

Circumference of semicircle =  $\frac{1}{2} \pi d$

$$\therefore DK = \frac{1}{2} \times \frac{22}{7} \times 63 = 99\text{cm}$$

16. Apio bought 30 books at 3000 per dozen. How much money did she spend?

**Solution**

1 dozen = 12

12 books cost 3000

$$\therefore 30 \text{ books cost } \frac{3000 \times 30}{12} = 7,500/=$$

17. A motorist travels 64km in 40 minutes. Find the speed of the motorist in kilometres per hour.

**Solution**

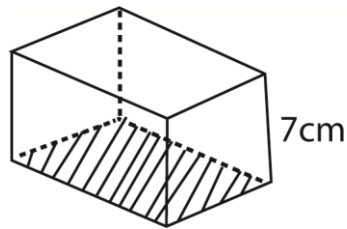
1hour = 60 minutes

But 40 minutes travel 64 km

∴ 60minutes travel  $\frac{64 \times 60}{40} = 96\text{km/hr}$

Hence, speed of motorist is 96km/hr

18. The area of the shaded part of the cuboid is  $12\text{cm}^2$ . Calculate the volume of the cuboid.



Volume = Area x height

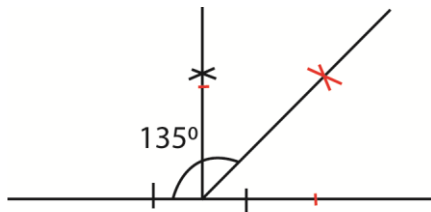
$$= 12 \times 7$$

$$= 84\text{cm}^3$$

19. Using a ruler, a pencil and a pair of compasses only construct an angle of  $135^\circ$  in the space below.

**Solution**

$$135^\circ = 90^\circ + 45^\circ$$



20. Hakim is three times as old as Lucky. Their total age is 52 years. How old is Lucky?

**Solution**

Let the age of Lucy be  $x$

The age of Hakim =  $3x$

$$3x + x = 52$$

$$4x = 52$$

$$x = \frac{52}{4} = 13 \text{ years}$$

Hence Lucy is 13 years old

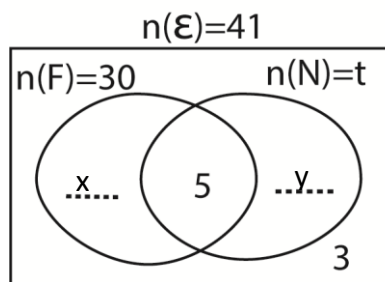
**SECTION B: 60 MARKS**

**Answer all questions in this section**

**Marks for each question are indicated in the brackets**

21. In a class of 41 pupils, 30 play Football (F),  $t$  play netball (N) and 5 play both Football and Netball. 3 pupils do not play any of the two games.

(a) Use the above information to complete the Venn diagram below (02 marks)



Solution

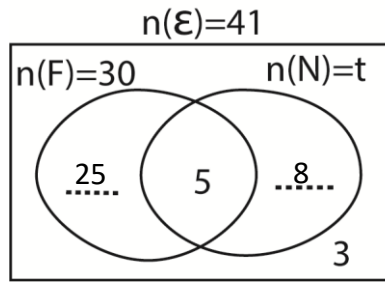
$$x + 5 = 30$$

$$x = 5$$

$$30 + y + 3 = 41$$

$$y = 8$$

therefore the completed Venn diagram is



(b) Find the value of t. (02marks)

**Solution**

$$t = 5 + 8 = 13$$

22. (a) Write 955 in Roman numerals (01mark)

$$955 = 90 + 50 + 5$$

In Roman numerals 955 = CMLV

(c) Find the product of the value of 2 and the the value of 8 in the number 4820 (04marks)

**Solution**

$$4820 = 4000 + 800 + 20 + 0$$

Required product

$$\begin{array}{r} 800 \\ \times 20 \\ \hline 000 \\ + 1600 \\ \hline \underline{\underline{16000}} \end{array}$$

23. (a) simplify:  $\frac{0.12 \times 5.4}{0.03 \times 0.6}$  (03marks)

$$\frac{0.12 \times 5.4}{0.03 \times 0.6} = \frac{\frac{12}{100} \times \frac{54}{10}}{\frac{3}{100} \times \frac{6}{10}} = \frac{12}{100} \times \frac{54}{10} \times \frac{100}{3} \times \frac{10}{6} = \frac{12 \times 54}{3 \times 6} = 36$$

(b) Express the recurring decimal 0.5454 ... as a common fraction. (03marks)

Solution

$$\text{Let } x = 0.5454\dots\dots\dots$$

$$100x = 54.5454\dots\dots\dots$$

$$(100-1)x = 54$$

$$99x = 54$$

$$x = \frac{54}{99} = \frac{6}{11}$$

24. The exchange rates in a bank are as follows

1 US dollars (\$) = Ug. Sh 3,400

1 British Pound Sterling (£) = Ug. Sh 4,600

1 Kenya shilling (K.sh) = Ug. Sh 35

(a) Convert Ug. Sh 1,840,000 to British Pound Sterling. (02marks)

**Solution**

$$4600 \text{ Ug. Sh.} = 1\text{£}$$

$$1,840,000 \text{ Ug. sh.} = \frac{1,840,000}{4600} = \frac{18,400}{46} = \frac{920}{23} = \frac{400}{23} = 400$$

∴ Ug. Sh 1,840,000 = 400 British Pound Sterling

(b) If a set of chairs cost \$700, find the equivalent cost of the chairs in Kenya shillings. (03marks)

**Solution**

Changing dollars to Uganda shillings

$$1\$ = \text{Ug sh } 3,400$$

$$700\$ = \text{Ug sh. } 3,400 \times 700 = 2,380,000$$

$$\begin{array}{r}
 3400 \\
 \times 700 \\
 \hline
 0,000 \\
 0,000 \\
 + 23,800 \\
 \hline
 \underline{\underline{2,380,000}}
 \end{array}$$

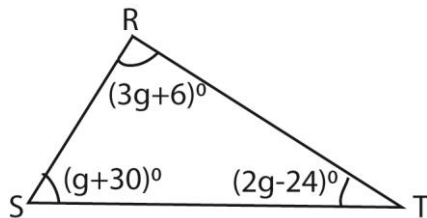
Changing Ug. sh. To K. sh.

Ug. Sh 35 = 1 K. sh.

$$\therefore \text{Ug. Sh } 2,380,000 = \text{K. sh. } \frac{2,380,000}{35} = \frac{476,000}{7} = 68,000$$

Hence a set of chairs cost = K. sh. 68,000/=

25. Study the figure below and use it to answer the questions that follow.



(c) Find the value of  $g$  (03marks)

**Solution**

$$(3g + 6) + (g + 30) + (2g - 24) = 180 \text{ (angle sum of a triangle)}$$

$$6g + 12 = 180$$

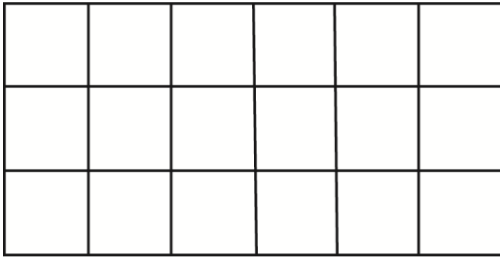
$$6g = 168$$

$$g = \frac{168}{6} = 28^\circ$$

(d) Calculate the size of angle RST. (01mark)

$$\text{Angle RSt} = 12 + 30 = 42^\circ$$

26. The figure below represents a rectangular floor which is covered by square tiles of area  $400 \text{ cm}^2$  each. Use it to answer the questions that follow.



(c) Find the area of the rectangular floor. (02marks)

**Solution**

Total number of tile =  $3 \times 6 = 18$

But 1 tile =  $400 \text{ cm}^2$

18 tiles =  $400 \times 18$

$$\begin{array}{r}
 400 \\
 \times 18 \\
 \hline
 3200 \\
 + 400 \\
 \hline
 \underline{\underline{7,200}}
 \end{array}$$

Hence the area of rectangular floor =  $7,200 \text{ cm}^2$

(d) Calculate the perimeter of the rectangular floor. (04marks)

**Soution**

Let the length of a tile be x

$x^2 = 400$

$x = \sqrt{400} = 20 \text{ cm}$

Primeter =  $2 \times 6 \times 20 + 2 \times 3 \times 20 \text{ cm}$

=  $240 + 120$

=  $360 \text{ cm}$



27. A taxi driver left town A for town B at 10.30 a.m. driving at a speed of 80 kilometres per hour. The driver reached town B at 2:00 p.m.

(a) Calculate the time take by the driver to reach town B.(03marks)

**Solution**

$$\text{Time taken} = (12.00 - 10.30) + 2.00$$

$$= 1.30 + 2.00$$

$$= 3\frac{1}{2} \text{ hours}$$

(b) Find the distance between town A and town B (02marks)

**Solution**

$$\text{Distance} = \text{speed} \times \text{time}$$

$$= 80 \times 3\frac{1}{2}$$

$$= 80 \times \frac{7}{2} = 280\text{km}$$

$$\text{Hence the distance between A and B} = 280\text{km}$$

28. Hajat bought 120 shares from a village SACCO at a simple interest rate of 30% per year. Eachsharecosts shs 3,000.

(a) Find the total interest after  $3\frac{1}{2}$  years. (03marks)

$$\text{Cost of 120 shares} = 120 \times 3000 = 360,000$$

$$\begin{array}{r} 3000 \\ \times 120 \\ \hline 0000 \\ 6000 \\ + 3000 \\ \hline 360,000 \\ \hline \hline \end{array}$$

$$\text{Interest} = \text{PTR}$$

$$= 360,000 \times 3\frac{1}{2} \times \frac{30}{100} = 360,000 \times \frac{7}{2} \times \frac{30}{100}$$

$$= 378,000/=$$

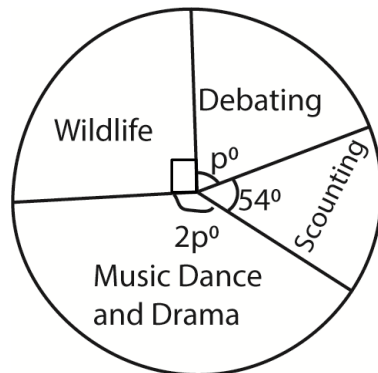
- (b) Calculate the total amount of money Hajati has in the SACCO after 3½ years (02marks)

Total amount of money = 360,000 + 378,000

$$\begin{array}{r} 360,000 \\ + 378,000 \\ \hline 738,000 \end{array}$$

Hence total amount of money Hajati Has = 738,000/=

29. The pie chart below shows pupils of Mpaata Primary School are distributed in various clubs in the school. Use it to answer the questions that follow.



- (a) There are 216 pupils in the debating club. Find the total number of pupils in the school. (04marks)

**Solution**

$$p + 90 + 2p + 54 = 360 \text{ (angle sum of a circle)}$$

$$3p + 144 = 360$$

$$3p = 216$$

$$p = 72^\circ$$

Let the total number of pupils be  $x$

$$\frac{72}{360}x = 216$$

$$x = \frac{360 \times 216}{72} = 1,080$$

∴ Total number of pupils = 1,080

(b) Express the number of pupils in the debating club as a percentage of the whole school. (02marks)

**Solution**

$$\text{Number of pupil in debating club} = \frac{54}{360} \times 1,080 = 162$$

$$\text{Percentage of pupil in debating club} = \frac{162}{1,080} \times 100 = 15\%$$

Or

$$\text{Percentage of pupil in debating club} = \frac{54}{360} \times 100 = 15\%$$

30. A cylindrical tank of diameter 70cm contains water to a height of 100cm. find in litres the amount of water the tank contains. (use  $\pi = \frac{22}{7}$ ) (04 marks)

**Solution**

$$\text{Radius} = \frac{\text{diameter}}{2} = \frac{70}{2} = 35\text{cm}$$

$$\begin{aligned} \text{Volume} &= \pi r^2 h \\ &= \frac{22}{7} \times 35 \times 35 \times 100 \\ &= 385,000\text{cm}^3 \end{aligned}$$

$$\text{But } 1000\text{cm}^3 = 1 \text{ litre}$$

$$\therefore 385,000\text{cm}^3 = \frac{385,000}{1000} = 385\text{l}$$

Hence volume of the tank = 385l

31. (a) Given that  $m = 2k$  and  $k = 5$ , find the value of  $2k + 6m$ . (03marks)

**Solution**

$$\begin{aligned}
 2k + 6m &= 2k + 6 \times 2k \\
 &= 14k \\
 &= 14 \times 5 \\
 &= 70
 \end{aligned}$$

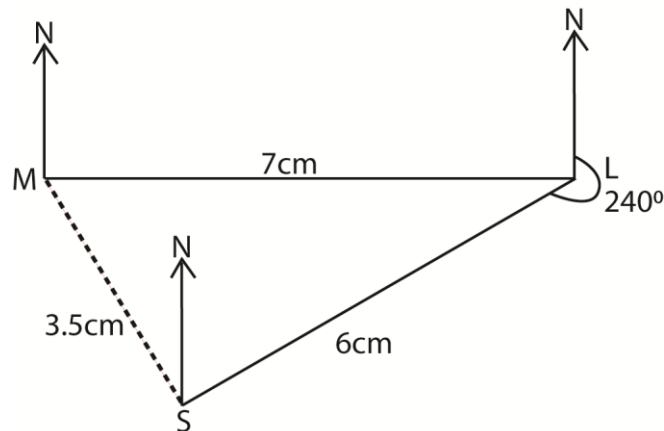
(b) Write the solution set for the inequality:  $6 < x < 10$ . (01mark)

{7, 8, 9}

32. A school library is 70 metres east of the main hall. The staff room is 60 metres from the library on a bearing of  $240^\circ$ .

(a) Using a scale of 1cm to represent 10 metres, show the three places on an accurate diagram. (04marks)

Let the school library be L; Main Hall, M and staff room, S



(b) Find the shortest distance between the main hall and the staff room.

The shortest distance =  $3.5 \times 10\text{m} = 35\text{m}$

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Thanks

Dr. Bbosa Science.