



UGANDA NATIONAL EXAMINATIONS BOARD

PRIMARY LEAVING EXAMINATION

2023

MATHEMATICS

Time Allowed: 2 hours 30 minutes

| Random No. | Personal No. |
|------------|--------------|
| | |

Candidate's Name: FRANKLEY FA120 0757519913

Candidate's Signature: MARKING GUIDE

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 the questions. All the working for both sections A and B must be shown in the spaces provided.
4. All the 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 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 | | |

SECTION A: 40 MARKS

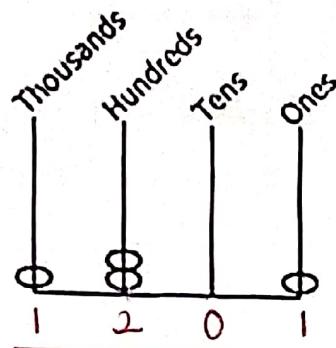
Answer all the questions in this section.

Questions 1 to 20 carry two marks each.

1. Work out: $63 + 54$

$$\begin{array}{r} 63 \\ + 54 \\ \hline 117 \end{array}$$

2. Write the base ten number shown on the abacus below.



3. Given that $R = \{a, b, c, d\}$ and $S = \{a, f, p, c, s\}$, find $n(R \cup S)$.

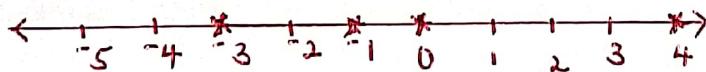
$$R = \{\textcircled{a}, \textcircled{b}, \textcircled{c}, \textcircled{d}\}$$

$$S = \{\textcircled{a}, f, p, \textcircled{c}, s\}$$

$$R \cup S = \{a, b, c, d, f, p, s\}$$

$$n(R \cup S) = 7$$

4. Arrange the Integers -3, 4, 0 and -1 in ascending order.



Order is -3, -1, 0, 4

5. A training for scouts started on a Wednesday and took 30 days. Find the day of the week on which the training ended.

| S | M | T | W | T | F | S |
|------------------------------|---|---|---|---|---|---|
| - | + | - | + | - | + | - |
| 0 | 1 | 2 | 3 | 4 | 5 | |
| (Wednesday) + 30 = - (mod 7) | | | | | | |

$$3 + 30 = \frac{33}{7} \quad 4 \text{ rem } 5$$

Friday

6. Change 750 millilitres into litres.

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

$$750 \text{ ml} = \left(\frac{750}{1000} \right) \text{ L}$$

$$\underline{\underline{0.75 \text{ L}}}$$

7. Find the value of $4^2 + 3^2 \times 9^0$.

$$(4 \times 4) + \{(3 \times 3) \times 1\}$$

$$16 + 9$$

$$\underline{\underline{25}}$$

8. A meeting that took 2 hours and 15 minutes ended at 1:20 p.m. At what time did the meeting begin?

Method 1

$$1 - 2 = - (\text{mod } 12)$$

$$(1+12) - 2 = - (\text{mod } 12)$$

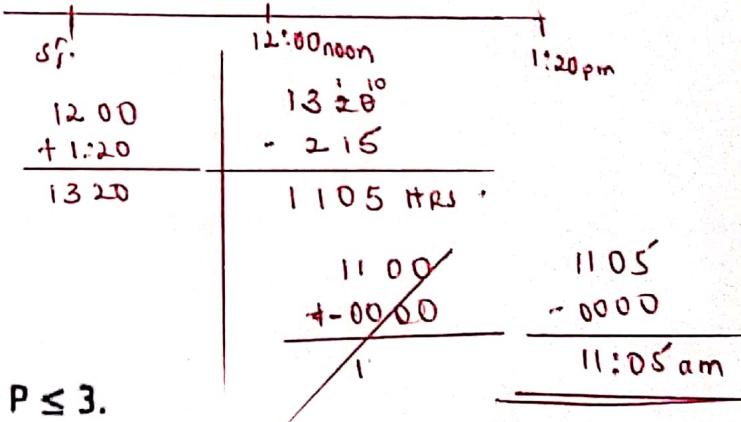
$$13 - 2 = 11 \text{ (mod } 12)$$

20 minutes

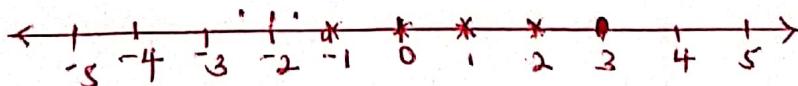
$$- \frac{15}{5} \text{ minutes}$$

$$\therefore \underline{\underline{11:05 \text{ am}}}$$

Method 2



9. Write the solution set for the inequality $P \leq 3$.



$$P = \{3, 2, 1, 0, -1, -2, \dots\}$$

10. Find the next number in the sequence:

$$1, 8, 27, 64, \dots$$

$1^3 \quad 2^3 \quad 3^3 \quad 4^3 \quad 5^3$

$$\begin{array}{r} 5 \times 5 \times 5 \\ 25 \\ \times 5 \\ \hline 125 \end{array}$$

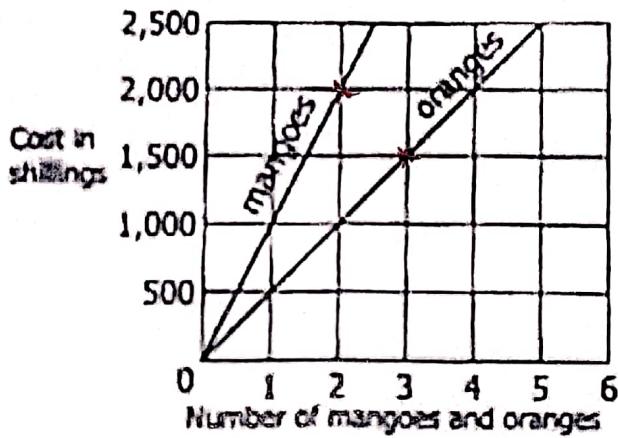


11. Change 14_{ten} to base three.

| B | N | R |
|---|----|---|
| 3 | 14 | |
| 3 | 4 | 2 |
| 3 | 1 | 1 |
| 0 | 1 | |

112_{three}

12. The graph below shows the cost in shillings of mangoes and oranges. Study the graph and use it to answer the question that follows.



Find the total cost of 2 mangoes and 3 oranges.

$$\begin{array}{r} \text{sh. } 2000 \\ + \text{sh. } 1500 \\ \hline \text{sh. } 3500 \end{array}$$

13. Given that $78t$ is a three-digit number which is divisible by 9, find the digit represented by t .

Since 0 is divisible by every number

Method 1.

$$7+8+t = 0 \pmod{9}$$

$$15+t = 0 \pmod{9}$$

$$15-15+t = 0-15 \pmod{9}$$

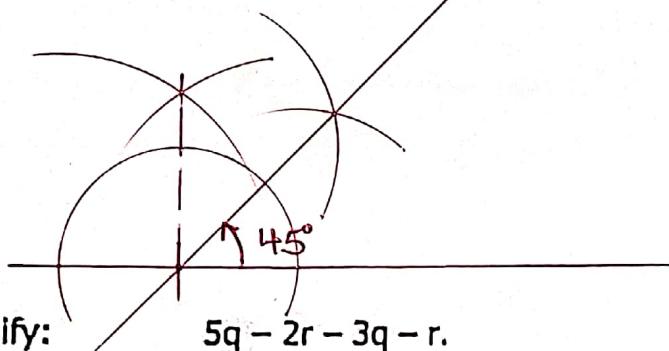
$$t = (0+9+9)-15 \pmod{9}$$

$$t = 18-15 \pmod{9}$$

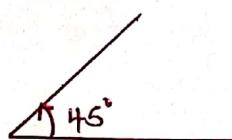
$$t = 3$$

14. Using a ruler and a pair of compasses only, construct an angle of 45° in the space below.

Accurate diagram



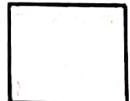
Sketch



15. Simplify: $5q - 2r - 3q - r$.

$$\underline{5q - 3q - 2r - r}$$

$$\underline{\underline{2q - 3r}}$$



16. A farmer sold the following number of eggs in a period of three days; 62, 73 and 78. Calculate the average number of eggs the farmer sold in that period.

$$\text{Average} = \frac{\text{sum}}{\text{No. of items}}$$

$$\underline{62 + 73 + 78}$$

$$\begin{array}{r} 3 \\ \overline{)71} \\ 7 \\ \hline 1 \end{array}$$

$$5$$

$$\underline{\underline{71 \text{ eggs}}}$$

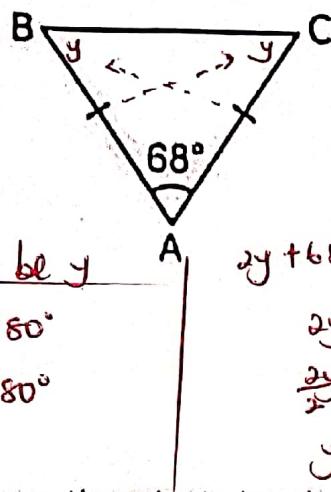
$$\begin{array}{r} 62 \\ + 73 \\ \hline 135 \\ + 78 \\ \hline 213 \end{array}$$

Turn Over

17. A businessman bought a watch at sh 45,000. He sold it and made a loss of sh 1,500. Find his selling price.

$$\begin{array}{r}
 \text{sh. } 45\overset{10}{0}00 \\
 - \text{sh. } 1500 \\
 \hline
 \text{sh } 43500
 \end{array}$$

18. In the diagram below, calculate the size of angle \underline{ABC} .



$$\begin{array}{r}
 180^\circ \\
 - 68^\circ \\
 \hline
 112^\circ
 \end{array}$$

Let angle ABC be y

$$y + y + 68^\circ = 180^\circ$$

$$2y + 68^\circ = 180^\circ$$

$$2y + 68^\circ - 68^\circ = 180^\circ - 68^\circ$$

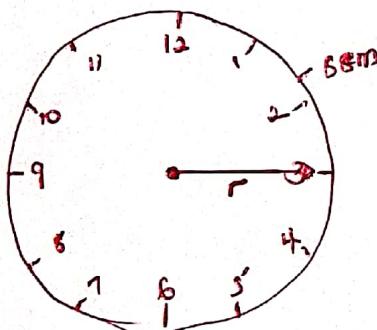
$$2y = 112^\circ$$

$$\frac{2y}{2} = \frac{112^\circ}{2}$$

$$y = 56^\circ$$

$$\therefore \underline{ABC} = 56^\circ$$

19. In one hour, the minute hand of a clock covers 88 cm. Calculate the length of the minute hand. (Use $\pi = \frac{22}{7}$)



from

$$2\pi r = c$$

$$2 \times \frac{22}{7} \times r = 88 \text{ cm}$$

$$\frac{44r}{7} = 88 \text{ cm}$$

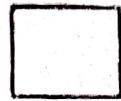
$$\frac{7}{44} \times \frac{44r}{7} = \left(\frac{88 \times 7}{44} \right) \text{ cm}$$

$$r = 14 \text{ cm}$$

length is 14cm 6

20. A pupil scored $\frac{20}{25}$ in the first term Mathematics test and $\frac{18}{20}$ in the second term Mathematics test. In which test did the pupil perform better?

| | | |
|---|----|----|
| 2 | 25 | 20 |
| 2 | 25 | 10 |
| 5 | 25 | 5 |
| 5 | 5 | 1 |
| | 1 | 1 |



$$\text{LCM} = 2 \times 2 \times 5 \times 5$$

$$4 \times 25$$

$$\underline{100}$$

First term

$$\begin{array}{r} 20 \\ \times 5 \\ \hline 100 \\ 25 \\ \hline 80 \end{array}$$

Second term

$$\begin{array}{r} 18 \\ \times 5 \\ \hline 90 \\ 20 \\ \hline 18 \\ \times 5 \\ \hline 90 \end{array}$$

In the second term test

SECTION B: 60 MARKS

Answer all the questions in this section.

Marks for each question are indicated in brackets.

21. (a) Simplify:

$$\frac{1}{2} - \left(\frac{1}{4} \times \frac{5}{4} \right)$$

$$\frac{1}{2} - \frac{5}{16}$$

$$\frac{\left(\frac{1}{2} \times \frac{8}{8} \right) - \left(\frac{5}{16} \times \frac{16}{16} \right)}{16}$$

$$\frac{1}{2} - \frac{1}{4} \div \frac{4}{5}$$

$$\frac{8 - 5}{16}$$

$$\underline{\underline{\frac{3}{16}}}$$

(03 marks)

- (b) Work out:

$$(0.27 \times 1.2) \div 0.9$$

$$\left(\frac{27}{100} \times \frac{12}{10} \right) \div \frac{9}{10}$$

$$\frac{27}{100} \times \frac{12}{10} \times \frac{10}{9}$$

$$\frac{0.27 \times 1.2}{0.9}$$

$$\frac{36}{100}$$

$$\underline{\underline{0.36}}$$

(02 marks)

22. An athlete covered 400 metres in 48 seconds. Calculate the speed of the athlete in kilometres per hour.

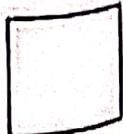
(04 marks)

$$\text{Speed} = \left(\frac{D \times 3600}{T \times 1000} \right) \text{km/h.}$$

$$\left(\frac{400 \times 3600}{48 \times 1000} \right) \text{km/h}$$

$$\underline{\underline{\frac{30}{1} \text{ km/h}}}$$

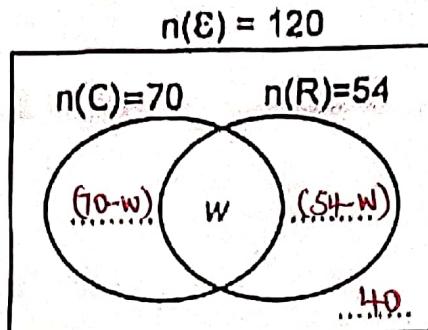
$$\underline{\underline{30 \text{ km/h}}}$$



23. A total of 120 guests were invited for a marriage ceremony. 70 guests attended the church service (C), 54 guests attended the reception (R) and w guests attended both the church service and the reception. 40 guests did not turn up for the marriage ceremony.

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

(03 marks)



- (b) Calculate the number of guests who attended both the church service and reception.

Method 1

$$(90 + 54 + 40) - 120$$

$$\begin{array}{r} 164 \\ - 120 \\ \hline 44 \end{array}$$

44 guests

Method 2

$$70 + 40 + 54 - w = 120$$

$$164 - w = 120$$

$$164 - 164 - w = 120 - 164$$

$$-w = -44$$

(02 marks)

$$\begin{array}{r} 70 \\ + 54 \\ \hline 124 \\ + 40 \\ \hline 164 \end{array}$$

$$w = 44$$

44 guests

$$\begin{array}{r} 70 \\ + 54 \\ \hline 124 \\ + 40 \\ \hline 164 \end{array}$$

24. In a certain school, there are 126, 90 and 72 pupils in Primary Five, Six and Seven respectively. In each class, groups with equal number of pupils were formed.

- (a) Find the largest number of pupils in each group.

(03 marks)

| | | | |
|---|-----|----|----|
| 2 | 126 | 90 | 72 |
| 3 | 63 | 45 | 36 |
| 3 | 21 | 15 | 12 |
| | 7 | 5 | 4 |

$$2 \times 3 \times 3$$

$$2 \times 9$$

18 pupils

- (b) How many groups were formed in Primary Five?

(02 marks)

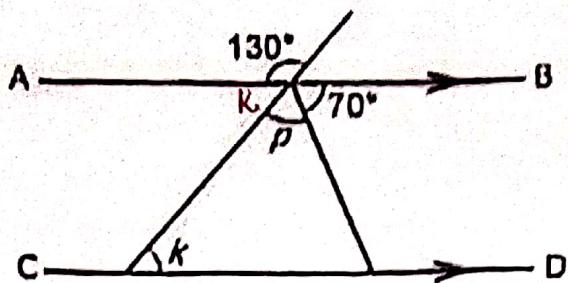
$$\begin{array}{r} 126 \\ - 18 \\ \hline 108 \\ - 18 \\ \hline 90 \\ - 18 \\ \hline 72 \\ - 18 \\ \hline 54 \\ - 18 \\ \hline 36 \\ - 18 \\ \hline 18 \\ - 18 \\ \hline 0 \end{array}$$

9

Turn Over

7 groups

25. In the diagram below, line AB is parallel to line CD. Study the diagram and use it to answer the questions that follow.



Find the size of;

- (a) angle p. (02 marks)

$$p + 70^\circ = 130^\circ \text{ (vertically opposite angles)}$$

$$p + 70^\circ - 70^\circ = 130^\circ - 70^\circ$$

$$\underline{\underline{p = 60^\circ}}$$

- (b) angle k. (02 marks)

$$k + 130^\circ = 180^\circ \text{ (straight angles)}$$

$$k + 130^\circ - 130^\circ = 180^\circ - 130^\circ$$

$$\underline{\underline{k = 50^\circ}}$$

26. A carton of salt contains 10 packets. Each packet has a mass of 250 grammes.

- (a) Work out the mass in Kilogrammes, of all the packets of salt in the carton. (02 marks)

$$\left(\frac{(40 \times 250)g}{1000g} \right) \text{kg}$$

$$\left(\frac{4 \times 25}{10} \right) \text{kg}$$

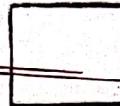
$$\frac{100}{10} \text{ kg}$$

$$\underline{\underline{10 \text{ kg}}}$$

- (b) A family uses a packet of salt every 5 days. Find the number of days the carton will last the family. (02 marks)

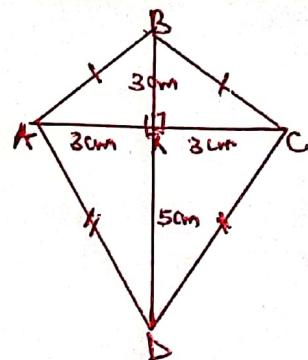
1 pac. is used in 5 days
40 pacs will be used in (5×40) days

200 days

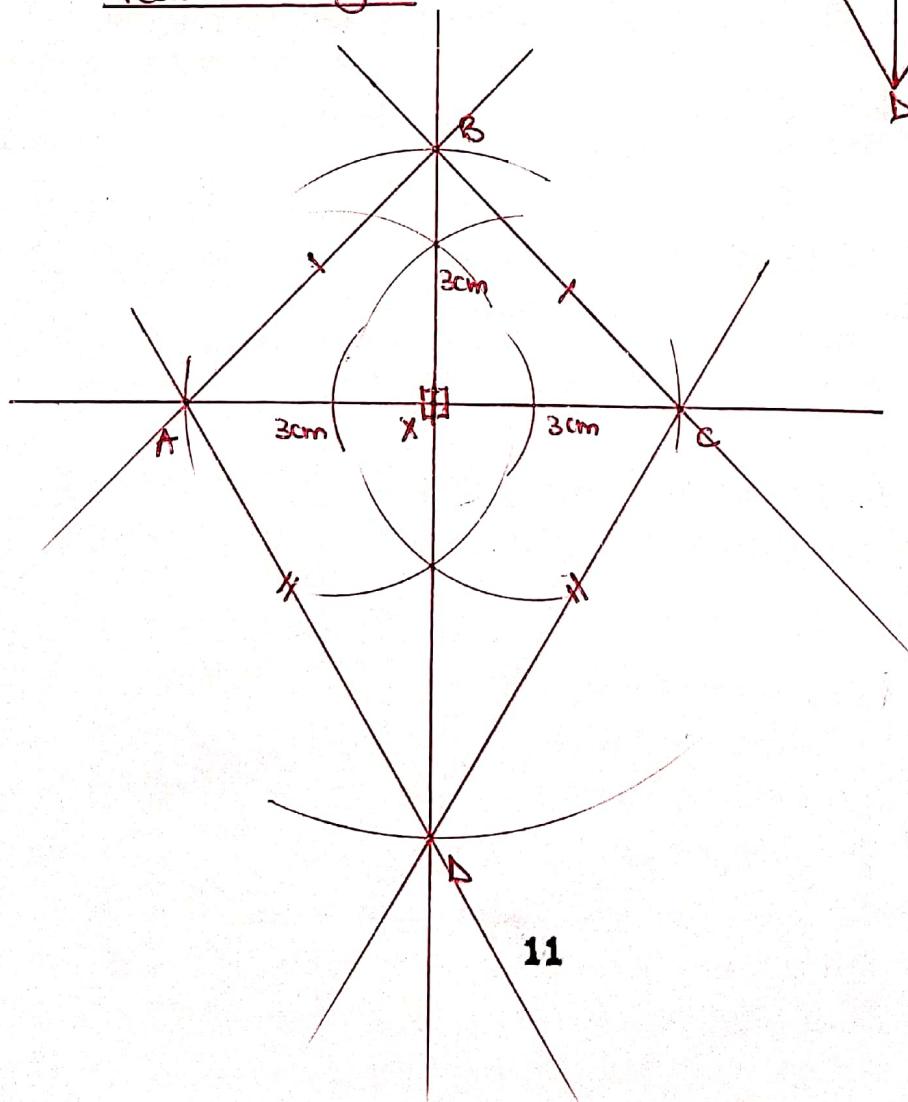


27. Using a ruler and a pair of compasses only, construct a kite ABCD in which diagonal AC = 6 cm. Diagonal BD bisects AC at X such that BX = 3 cm and DX = 5 cm. (05 marks).

Sketch



Accurate diagram



20. A man is four times as old as his daughter. Six years ago, the sum of their age was 48 years.

Find;

- (a) The age of the daughter now.

| | Man | Daughter |
|--------------|----------|----------|
| Now. | $4P$ | P |
| Before 6 yrs | $4P - 6$ | $P - 6$ |

$$4P - 6 + P - 6 = 48$$

$$4P + P - 6 - 6 = 48$$

$$5P - 12 = 48$$

$$5P - 12 + 12 = 48 + 12 \quad (03 \text{ marks})$$

$$5P = 60$$

$$\frac{5P}{5} = \frac{60}{5}$$

$$P = 12$$

Daughter : 12 years

- (b) The age of the man six years ago.

(02 marks)

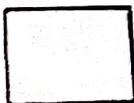
$$4P - 6$$

$$(4 \times P) - 6$$

$$(4 \times 12) - 6$$

$$48 - 6$$

42 years



29. A bank bought and sold foreign currencies in Uganda shillings (Ug.sh) on a certain day as shown in the table below. Study the table and use it to answer the questions that follow.

(x)

(÷)

| Currency | Buying in Ug.sh | Selling in Ug.sh |
|---------------------------|-----------------|------------------|
| 1 Kenya shilling (Ksh) | 24 | 26 |
| 1 US dollar (\$) | 3,900 | 3,950 |
| 1 Great Britain pound (£) | 4,400 | 4,700 |

F

- (a) A tourist had £600 and exchanged them for Uganda shillings. Find the amount of money in Uganda shillings the tourist got.

F (x) L

(02 marks)

(600×4400) Uganda shillings

2,640,000 Uganda shillings

$$\begin{array}{r}
 & 4 & 4 \\
 & \times & 6 \\
 \hline
 & 2 & 6 & 4
 \end{array}$$

- (iii) ~~Mosim had US dollars 200 to exchange for Kenya shillings. Find the amount of money in Kenya shillings he got from the bank.~~

F (x) L (+) F

(01 marks)

$$\left(\frac{100}{200} \times 3900 \right) \text{Kenya shillings}$$

30000 Kenya shillings

30. A farmer employed two workers to dig a piece of land. The first worker could dig the land alone in 6 days. The second worker could dig the same piece of land alone in 3 days. The two workers dug the land together.

Method 1

$$\begin{array}{l} \text{Time taken} = \frac{\text{Product}}{\text{Sum}} \\ \hline 6 \times 3 \\ 6 + 3 \\ \hline + 8 \\ \hline 9 \\ \hline 1 \text{ day} \end{array}$$

Method 2

fraction dug by each

first - $\frac{1}{6}$

second - $\frac{1}{3}$

Both working together in a day -

$$\begin{array}{r} \frac{1}{6} + \frac{1}{3} \\ \hline 3 + 6 \\ \hline 18 \\ \hline \frac{9}{18} \end{array}$$

(01 marks)

Time taken

$$1 \div \frac{9}{18}$$

$$1 \times \frac{18}{9} = \frac{2}{1}$$

- 2 days

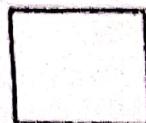
- (b) The farmer paid each worker sh 15,000 per day. Calculate the amount of money the farmer spent to dig the piece of land.

$$\text{sh. } (15000 \times 2 \times 2)$$

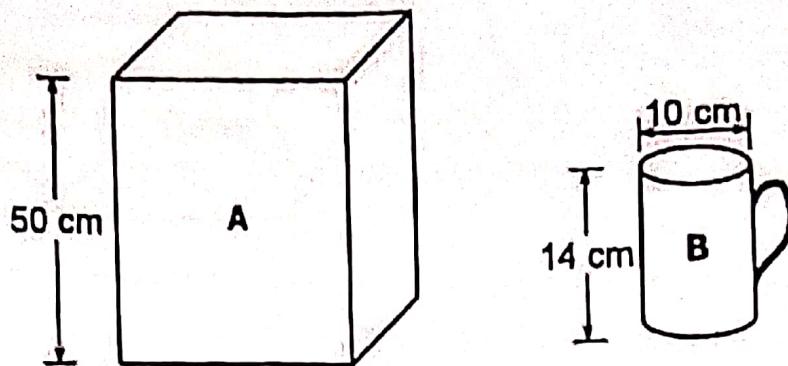
(02 marks)

$$\text{sh. } (15000 \times 4)$$

$$\text{sh. } 60000$$



31. Forty full cups of water in cup B fill container A. Study the diagrams and answer the questions that follow.



- (a) Find the volume of cup B. (Use $\pi = \frac{22}{7}$)

(02 marks)

Volume: $\pi r^2 h$

$$\frac{22}{7} \times \frac{10}{2} \times \frac{10}{2} \times 14$$

$$\underline{\underline{1100 \text{ cm}^3}}$$

- (b) Calculate the base area of container A.

(03 marks)

Let the base area be y.

base area \times height = Volume

$$y \times 50 \text{ cm} = (1100 \times 40) \text{ cm}^3$$

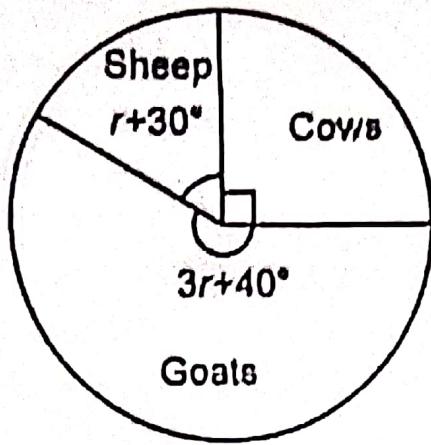
$$\frac{y \times 50 \text{ cm}}{50 \text{ cm}} = \frac{(1100 \times 40) \text{ cm}^3}{50 \text{ cm}}$$

$$y = (110 \times 8) \text{ cm}^2$$

$$y = 880 \text{ cm}^2$$

Base area: 880 cm^2

32. The pie chart below represents the number of animals reared on Amany's farm. Study the pie chart and use it to answer the questions that follow.



(a) Find the value of r .

$$90^\circ + r + 30^\circ + 3r + 40^\circ = 360^\circ$$

$$90^\circ + 30^\circ + 40^\circ + r + 3r = 360^\circ$$

$$160^\circ + 4r = 360^\circ$$

$$160^\circ - 160^\circ + 4r = 360^\circ - 160^\circ$$

$$4r = 200^\circ$$

$$\frac{4r}{4} = \frac{200^\circ}{4}$$

$$r = 50^\circ$$

(02 marks)

$$\frac{120^\circ + 40^\circ}{160^\circ}$$

(b) Given that there are 11 more goats than sheep on the farm, calculate the total number of animals on the farm. (04 marks)

Goats - sheep

$$(3r + 40^\circ) - (r + 30^\circ)$$

$$3r + 40^\circ - r - 30^\circ$$

$$3r - r + 40^\circ - 30^\circ$$

$$2r + 10^\circ$$

$$(2 \times 50^\circ) + 10^\circ$$

$$100^\circ + 10^\circ$$

$$110^\circ$$

$$110^\circ \rightarrow 11$$

$$360^\circ \rightarrow \left(\frac{11 \times 36}{11} \right) \text{ animals}$$

36 animals

