

THE E-LEARN EXAMINATIONS BOARD

PRE NATIONAL MOCK 2024

SET TWO / FOUR

MATHEMATICS GUIDE

Time Allowed: 2 hours 15 minutes



Index No.

EMIS No.						Personal No.		

COMPILED: **TR. MELEKI WOKULIRA** 0784140460

Read the following instructions carefully:

1. Do not forget to write your **school** or **district name** on the paper.
2. This paper has two sections: **A** and **B**. Section **A** has **20** questions and section **B** has **12** questions. The paper has **12** printed pages altogether.
3. Answer **all** questions. **All** working for both sections **A** and **B** must be shown in the spaces provided.
4. **All** answers **must** be written using a **blue** or **black** ball point pen or ink. Any work written in pencil will **not** be marked.
5. Unnecessary **changes** in your work and handwriting that cannot be read easily may lead to **loss of marks**.
6. 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 – 32		
TOTAL		

SECTION A: 40 MARKS

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

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

1. Work out: $77 + 33$

$$\begin{array}{r} 77 \\ 33 \\ \hline 110 \end{array}$$

B₂ for 110.

2. Write in words: 45,024

Thousands	Units
45	024

B₂ for answer.

Emphasize hyphenation of numbers.

Forty-five thousand -twenty-four

3. Write CDLXII in Hindu-Arabic numerals.

CD	LX	II
400	60	2

$$\begin{array}{r} 400 \\ 60 \\ + 2 \\ \hline 462 \end{array}$$

M₁ for converting.

A₁ for 462.

4. Work out using distributive property: $(4 \times 50) - (4 \times 40)$

$$\begin{array}{l} (4 \times 50) - (4 \times 40) \\ 4(50 - 40) \\ 4(10) \\ \underline{4 \times 10 = 40} \end{array}$$

M₁ for $4(50-40)$

A₁ for 40.

5. Change 38_{ten} to base five.

B	No	Rem
5	38	3
5	7	2
5	1	1
	0	



123_{five}

M₁ for correct division.

A₁ for 123_{five}

6. Write 0.009 in scientific notation.

$$0.009 \div 10^{-1} = 0.09$$

$$0.009 \div 10^{-2} = 0.9$$

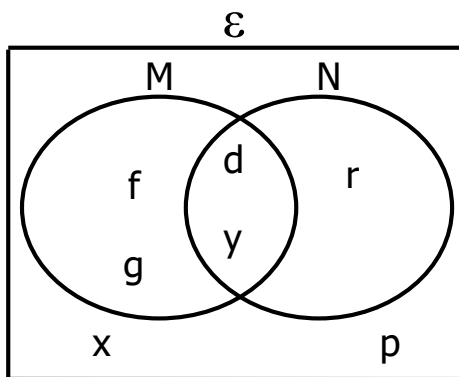
$$0.009 \div 10^{-3} = 9$$

$$\underline{0.009 = 9 \times 10^{-3}}$$

M₁ for any correct working

A₁ for 9×10^{-3}

7. In the Venn diagram below, find $n(M \cap N)$.



M₁ for listing elements

A₁ for counting and writing five elements.

$$M \cap N = \{f, g, r, x, p\}$$

$$\underline{n(M \cap N) = 5}$$

8. A basket has 12 yellow and 4 green oranges. Find the probability of picking green orange at random from the basket.

$$\text{Prob} = \frac{n(DC)}{n(TC)}$$

$$n(DC) = 4$$

$$n(TC) = 12 + 4 = 16$$

$$\text{Prob} = \frac{4}{16}$$

M₁ for finding $n(TC)$ as 16

A₁ for $\frac{4}{16}$, $\frac{1}{4}$, $\frac{2}{8}$

9. Find the expanded number: $(5 \times 10^2) + (5 \times 10^{-2})$

$$(5 \times 10^2) + (5 \times 10^{-2})$$

$$(5 \times 10 \times 10) + \left(5 \times \frac{1}{10^2}\right)$$

$$500 + 5 \times \frac{1}{10 \times 10}$$

$$500 + 5 \times \frac{1}{100}$$

$$500 + 0.05$$

$$500.00$$

$$+ 0.05$$

$$\underline{500.05}$$

M₁ for correct working

A₁ for 500.05

Encourage learners to show the necessary steps.

$$500 + \frac{\quad}{100}$$

10. Work out: $3 - 5 = p$ (finite 7)

$$3 - 5 = P \text{ (finite 7)}$$

$$P = (3 + 7) - 5 \text{ (finite 7)}$$

$$P = 10 - 5 \text{ (finite 7)}$$

$$\underline{P = 5 \text{ (finite 7)}}$$

M₁ for $P = (3+7) - 5$ (finite 7)

A₁ for $P = 5$ (finite 7)

11. Set Y has 64 subsets. Find $n(Y)$.

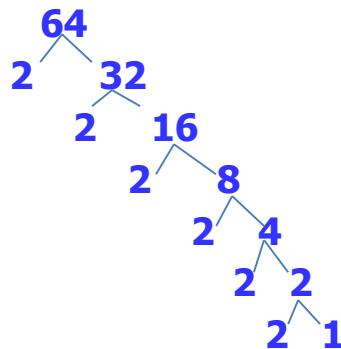
$$2^n = n(C)$$

$$2^n = 64$$

$$2^n = 2^6$$

$$n = 6$$

$$\underline{n(y) = 6}$$



M₁ for $2^n = 2^6$

A₁ for $n(y) = 6$

12. An academic term started on a Monday and after 38 days, Midterm examination was written. On which day did the midterm examination start?

$$\text{Day} + 38 = \underline{\quad} \text{ (finite 7)}$$

$$1 + 38 = \underline{\quad} \text{ (finite 7)}$$

$$39/7 = \underline{\quad} \text{ (finite 7)}$$

$$\underline{5} \text{ rem } 4 = \underline{\quad} \text{ (finite 7)}$$

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

The midterm exam started on Thursday

M₁ for correct working.

Accept the use of a calendar.

A₁ for Thursday.

13. Work out: $\frac{1}{2}$ of $24 - (3 \times 4) + 5$.

$$\frac{1}{2} \text{ of } 24 - (3 \times 4) + 5$$

BODMAS

$$\left(\frac{1}{2} \text{ of } 24\right) - 12 + 5$$

$$\frac{1}{2} \times 24 - 12 + 5$$

$$12 - 12 + 5$$

$$(12 + 5) - 12$$

M₁ for correct working up to $12 - 12 + 5$.

A₁ for 5

B

14. The LCM of two numbers is 180 and their GCF is 6. One of the numbers is 36. Find the other number.

Let the no be y

$$1^{\text{st}} \text{ no} \times 2^{\text{nd}} \text{ no} = \text{LCM} \times \text{GCF}$$

$$36 \times y = 180 \times 6$$

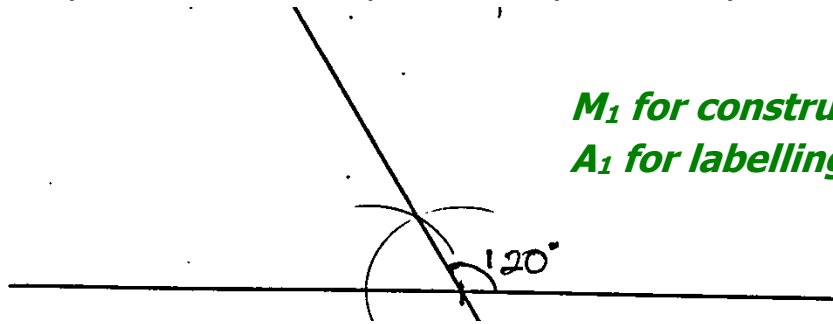
$$\frac{36 \times y}{36} = \frac{180 \times 6}{36}$$

$$y = 30$$

M₁ for correct substitution and division.

A₁ for 30.

15. With the help of a ruler and a pair of compasses only, construct an angle of 120°



M₁ for construction.

A₁ for labelling.

16. Evaluate: $\frac{n^5 \times n^3}{n^6}$

$$\frac{n^5 \times n^3}{n^6} = n^5 \times n^3 \div n^6$$

$$= n^{(5+3)-6}$$

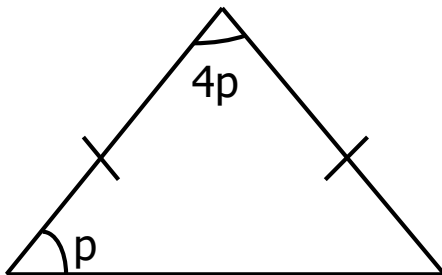
$$= n^{8-6}$$

$$= n^2$$

M₁ for any correct working.

A₁ for n².

17. In the diagram below, find the value of p in degrees.



$$P + P + 4P = 180^\circ$$

$$6P = 180^\circ$$

$$\frac{6p}{6} = \frac{180^\circ}{6}$$

$$P = 30^\circ$$

M₁ for correct equation.

A₁ for 30°

Encourage learners to indicate all the necessary information and findings in the figure

18. It is 7:00 p.m. What time is on a 24 hour clock?

12 00

+7 00

19 00 hours

M₁ for adding.

A₁ for 1900hrs

19. Think of a number, add 3 to it and triple the result, the answer is 24. What is the number?

Let the number be y

$$3(y + 3) = 24$$

$$3y + 9 = 24$$

$$3y + 9 - 9 = 24 - 9$$

$$3y = 15$$

$$\frac{3y}{3} = \frac{15}{3}$$

$$\underline{Y = 5}$$

M₁ for correct equation.

A₁ for y=5.

Encourage learners to show all steps.

20. Akello read a book from page 7 to page 16. How many papers did she read?

$$\text{No of papers} = \frac{\text{No of pages}}{2}$$

$$\text{No of pags} = (16 - 7) + 1$$

$$= 9 + 1$$

$$= 10$$

$$\text{No of pags} = \frac{10}{2} = 5$$

Akello read 5 papers

M₁ for 10 pages.

A₁ for Okello read 5 papers.

SECTION B: 60 MARKS

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

Marks for each question are indicated in brackets.

21. (a) Simplify: $\frac{3}{4} + \frac{1}{16} \div \frac{1}{4}$

(02 Marks)

$$\frac{3}{4} + \frac{1}{16} \div \frac{1}{4} \text{ BODMAS}$$

$$\frac{3}{4} + \left(\frac{1}{16} \div \frac{1}{4} \right)$$

$$\frac{3}{4} + \left(\frac{1}{16} \times \frac{4}{1} \right)$$

$$\frac{3}{4} + \frac{1}{4}$$

$$M_1 \text{ for } \frac{3}{4} + \frac{1}{4}$$

A₁ for 1.

Reject 4 since its not simplified

$$\frac{3+1}{4} = \frac{4}{4} = 1$$

(b) Work out: $\frac{0.28 \times 3.6}{0.7 \times 0.6}$

(02 Marks)

$(0.28 \times 3.6) \div (0.7 \times 0.6)$

$\left(\frac{28}{100} \times \frac{36}{10}\right) \div \left(\frac{7}{10} \times \frac{6}{10}\right)$

$\frac{28^4}{100} \times \frac{36^6}{10} \times \frac{10}{7_1} \times \frac{10}{6_1}$

$\frac{4 \times 6}{10} = \frac{24}{10} = 2.4$

M₁ for changing decimals into fractions.

A₁ for 2.4 (reject without brackets.)

22. The sum of 3 consecutive even numbers is 24.

Find;

(a) the numbers.

(04 Marks)

Let the first even no be n

1 st no	2 nd no	3 rd no	sum
n	n+2	n+4	24

$n+n+2+n+4 = 24$

$n+n+n+2+4 = 24$

$3n+6 = 24$

$3n + 6 - = 24 - 6$

$3n = 18$

$\frac{3n}{3} = \frac{18}{3}$

n=6

1 st no	2 nd no	3 rd no
n	n+2	n+4
6	6+2	6+4
	8	10

M₁ for correct equation.

M₁ for n=6

A₁ for second number 8

A₁ for third number 10

Encourage learners to show all steps when solving an equation.

(b) the product of the numbers.

(01 Mark)

$6 \times 8 \times 10$

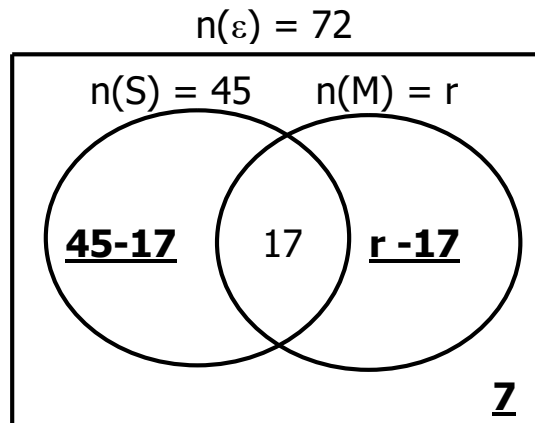
48×10

480

A₁ for 480

23. A total of 72 guests were invited to a party. 45 guests were served with soda (S), r guests were served with mineral water (M), 17 guests were served with both drinks while 7 guests did not turn up.

- (a) Use the given information to complete the Venn diagram below. (03 Marks)



*B₁ for 45-17 or 28.
B₁ for r-17
B₁ for 7
Reject if a learner entered both 45-17 and 28*

- (b) Calculate the number of guests who were served with mineral water. (03 Marks)

$$45 + r - 17 + 7 = 72$$

$$45 + r - 10 = 72$$

$$45 - 10 + r = 72$$

$$35 + r = 72$$

$$35 - 35 + r = 72 - 35$$

$$r = 37$$

37 guests were served with mineral water

*M₁ for correct equation.
M₁ for collecting like terms.
A₁ for 37 guests*

24. A square piece of paper has an area of 2.25 square centimeters. Find the;

- (a) length of the paper. (03 Marks)

$$L \times L = \text{Area}$$

$$L^2 = 2.25\text{cm}^2$$

$$\sqrt{L^2} = \sqrt{2.25\text{cm}^2}$$

$$L = \frac{\sqrt{225}}{100} \times \sqrt{\text{cm}^2}$$

$$L = \frac{15}{10} \text{cm}$$

$$\mathbf{L = 1.5cm}$$

*M₁ for the square root of 225=15
M₁ for the square root of 100=10
A₁ for L=1.5*

(b) perimeter of the paper.

(01 mark)

$$P = 4 \times L$$

$$= 4 \times 1.5\text{cm}$$

$$= 4 \times \frac{15}{10}\text{cm}$$

A₁ for 6cm

$$\frac{60}{10}$$

$$= 6\text{ cm}$$

$$\underline{= 6\text{ cm}}$$

25. (a) Change 2012_{three} to base ten.

(02 Marks)

3^3	3^2	3^1	3^0
2	0	1	2

$$(2 \times 3^3) + (0 \times 3^2) + (1 \times 3^1) + (2 \times 3^0)$$

M₁ for expansion using powers of 3

$$(2 \times 3 \times 3 \times 3) + 0 + (1 \times 3) + (2 \times 1)$$

A₁ for 59_{ten}

$$54 + 3 + 2$$

$$\underline{59_{\text{ten}}}$$

(b) Find the unknown base m: $43_m = 102_{\text{five}}$.

(03 Marks)

$$43_m = 102_{\text{five}}$$

$$4m^1 3m^0 = 15^2 05^1 25^0$$

$$(4 \times m^1) + (3 \times m^0) = (1 \times 5 \times 5) + (0 \times 5) + (2 \times 1)$$

$$4m + (3 \times 1) = 25 + 2$$

M₁ for $4m+3=27$

$$4m + 3 - 3 = 27 - 3$$

M₁ for $m=6$

$$4m = 24$$

A₁ for base six

$$\frac{4m}{4} = \frac{24}{4}$$

Encourage learners to write base names in words.

$$m = 6$$

m is base six

26. Below is Hilda's shopping list. Use it to answer the questions that follow.

Item	Amount
12 books	Sh 15,600
24 fountain pens	Sh 26,000
6 pencils	Sh 6,000

(a) Find the cost of one fountain pen.

(01 Mark)

$$\frac{\text{sh. } 26,000}{4}$$

4

Sh 6500

A₁ for Sh 6500

- (b) If Hilda had bought 7 books, how much would she have spent on books? (02 Marks)

cost of 1 book

$$\frac{\text{shs } 15600}{12}$$

12

Sh 1300

M₁ for unit cost of the book Sh 1300

A₁ for total cost of seven books (Sh 9100)

Cost of 7 books

Sh 1300

$$\times 7$$

Sh 9100

- (c) Having paid for all the three items, Hilda remained with sh 2,400. How much money did she go with to the shop? (02 Marks)

Sh 15600

Sh 26000

+sh 6000

Sh 47600

M₁ for Sh 47,600

A₁ for Sh 50,000

A₁ for 37 guests.

Encourage learners to write Sh. discourage /=

Sh 47600

+ sh 2400

Sh 50000

27. A man spent his salary as follows; $\frac{1}{4}$ on food, $\frac{1}{4}$ on rent and $\frac{1}{3}$ of remainder on others. He saved sh 270,000.

- (a) What fraction of his salary did he save? (03 Marks)

$$\text{Rent} = \frac{1}{4}$$

$$\text{rem} = 1 - \left(\frac{1}{4} + \frac{1}{4} \right)$$

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

$$\frac{4}{4} - \frac{2}{4}$$

$$= \frac{2}{4}$$

$$\text{Others} = \frac{1}{3} \times \frac{2}{4} = \frac{2}{12}$$

$$\text{Saving} = \frac{2}{4} - \frac{2}{12}$$

$$\frac{6 - 2}{12}$$

$$\frac{4}{12}$$

$$\frac{1}{3}$$

$$\frac{1}{3}$$

M₁ for $\frac{2}{4}$ or $\frac{1}{2}$ as a remainder.

M₁ for $\frac{2}{12}$ or $\frac{1}{6}$ for others

A₁ for $\frac{1}{3}$ for saving.

Follow through the learner's work.

(b) Calculate his salary?

(02 Marks)

Let his salary be n

$$\frac{1}{3} \text{ of } n = \text{sh } 270,000$$

$$\frac{1 \times n}{3} = \text{shs } 270,000$$

$$3 \times \frac{n}{3} = \text{shs } 270,000$$

shs 270000

$\times 3$

n = Shs 810,000

M₁ for correct equation.

A₁ for n=sh 810,000.

Accept other approaches.

28. In a class of 58 pupils, all paid for a study trip. Each boy paid sh 45,000 while each girl paid sh 40,000. The sum of money paid by all girls was sh 1,280,000.

(a) How many girls are in the class?

(02 Marks)

No of girls

shs 1,280,000

sh 40,000

128³²

4

32 girls

M₁ for dividing correctly.

A₁ for 32 girls.

(b) How much money did the boys pay altogether?

(02 Marks)

No of boys

58

-32

26 boys

M₁ for 26 boys

Amount paid by boys

$$\begin{array}{r} \text{Sh } 4500 \\ \times \quad 26 \\ \hline 27000 \\ + 9000 \\ \hline \text{Sh } 117,000 \end{array}$$

A₁ for Sh 117,000

Encourage learners to show how they multiplied.

(c) How much money was paid by the whole class? (02 Marks)

$$\begin{array}{r} \text{Sh } 1, 280,000 \\ + \text{sh } 117,000 \\ \hline \text{Sh } 1, 397,000 \end{array}$$

B₂ for sh 1,397,000

29. In a school, two bells for lower and upper school change lessons at intervals of 30 minutes and 60 minutes respectively.

(a) Every after how many minutes will both bells ring together? (02 Marks)

2	30	60
2	15	30
3	15	15
5	5	5
	1	1

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

$$45 \times 15$$

60 minutes

Both bells will ring together every 60 minutes

M₁ for prime factorization.

A₁ for 60 minutes.

Encourage learners to use prime numbers to prime factorise.

(b) If the bells ring together at 7:00 a.m. for the first time, at what time will they ring together for the third time? (02 Marks)

Time in hours

60 minutes = 1 hour

1st time
7:00am

2nd time

7:00am
+1:00
8:00am

3rd time

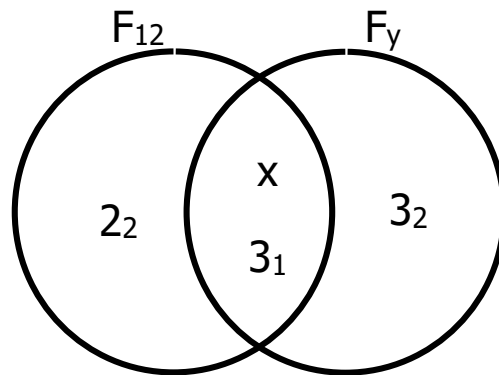
8: 00 am
+1:00
9: 00am

B₁ for 8:00am

A₁ for 9:00am

Accept other correct approaches

30. The Venn diagram below shows the prime factors of two numbers. Study it and answer the questions that follow.



- (a) Find the value of;

(i) x

(02 Marks)

$$12 = \{2_2, x, 3\}$$

$$12 = 2 \times 3 \times x$$

$$12 = 6x$$

$$\frac{12^3}{6} = \frac{6x}{6}$$

$$\underline{\underline{x = 2}}$$

M₁ for obtaining $6x = 12$

A₁ for $x=2_1$

Reject without subscript.

(ii) y

(02 Marks)

$$y = \{2_1, 3_1, 3_2\}$$

$$y = 2 \times 3 \times 3$$

$$y = 6 \times 3$$

$$\underline{\underline{y = 18}}$$

M₁ for $y=2 \times 3 \times 3$

A₁ for $y=18$

- (b) Work out the LCM of 12 and y

(01 Mark)

LCM = product of the union set

$$\text{LCM} = 2 \times 2 \times 3 \times 3$$

$$= 4 \times 9$$

$$\underline{\underline{= 36}}$$

A₁ for 36.

Reject if the learner prime factorised.

31. The distance from Mbarara City to Kampala City is 290 km.

- (a) At what speed did the driver use to cover the journey if he left Mbarara at 7:00 a.m. and reached Kampala at 12:00 noon?

(03 Marks)

$$\text{Speed} = D \div T$$

$$D = 290\text{km}$$

$$\text{Time} = 12\ 00$$

$$- \underline{7\ 00}$$

$$\underline{5\ 00\ \text{hours}}$$

$$\text{Speed} = \frac{290\text{km}}{8\ \text{hours}} = \underline{58\text{km/hr}}$$

M₁ for 5 hours

B₁ for dividing 290 by 8hrs

A₁ for 58Km/hr

- (b) On the return journey, the driver left Kampala at 5:00 p.m. driving at an average speed of 60 km/h. At what time did he arrive in Mbarara City? (03 Marks)

$$\text{Arrival time} = \text{dep time} + \text{Duration}$$

$$\text{Dep time} = 5:00\text{pm}$$

$$\text{Duration} = \frac{\text{distance}}{\text{speed}}$$

$$\frac{290\text{km}}{1} \times \frac{60\text{km}}{1\ \text{hr}}$$

$$\frac{290\text{km}}{1} \times \frac{1\text{hr}}{60}$$

$$\frac{29^{4r5}}{6}$$

M₁ for $4\frac{5}{6}\text{hrs}$

B₁ for 4hrs and 50 mins

A₁ for 9:50pm

$$= 4\frac{5}{6}\text{hrs}$$

$$4\text{hrs and } \left(\frac{5}{6} \times 60^{10}\text{min}\right)$$

$$4\ \text{hours and } 50\ \text{minutes}$$

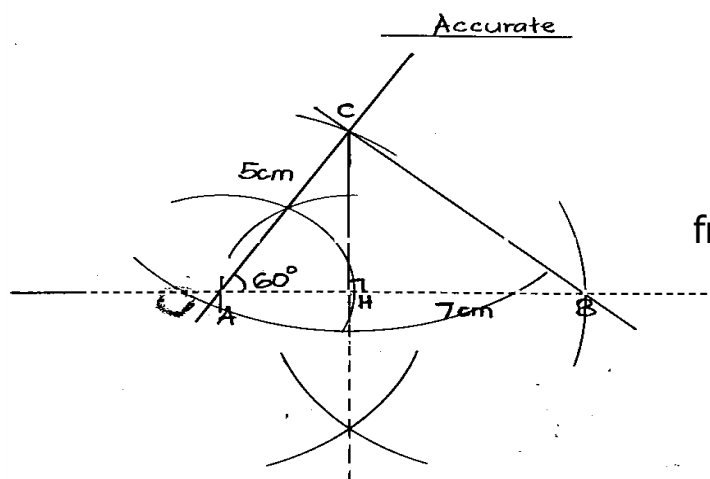
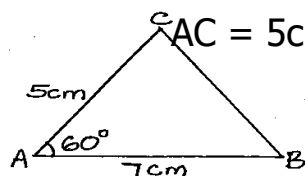
$$\text{A.T} = 5 : 00$$

$$+ \underline{4 : 50}$$

$$\underline{9 : 50\text{pm}}$$

He arrived in Mbarara at 9: 50pm

32. (a) Using a ruler and a pair of compasses only, construct a triangle ABC in which side AB = 7 cm, angle CAB = 60° and side AC = 5cm. (04 Marks)



S₁

C₁

L₁

L₁

L₁

- (b) Drop a perpendicular line from vertex C to meet line AB at point H. (01 Mark)

END



E-LEARN EXAMINATIONS BOARD



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