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.		

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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 **1**2 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

7 7
3 3
110

B_2 for 110.

2. Write in words: 45,024

Thousands	Units
45	024

B_2 for answer.
Emphasize hyphenation of numbers.

Forty-five thousand -twenty-four

3. Write CDLXII in Hindu-Arabic numerals.

CD	LX	II
400	60	2

400
60
+ 2
462

M_1 for converting.
A_1 for 462.

4. Work out using distributive property: (4×50) – (4×40)

(4×50) – (4 × 40)
4(50 – 40)
4(10)
4×10 = 40

M_1 for 4(50-40)
A_1 for 40.

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

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

123_{five}

M_1 for correct division.
A_1 for 123_{five}

6. Write 0.009 in scientific notation.

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

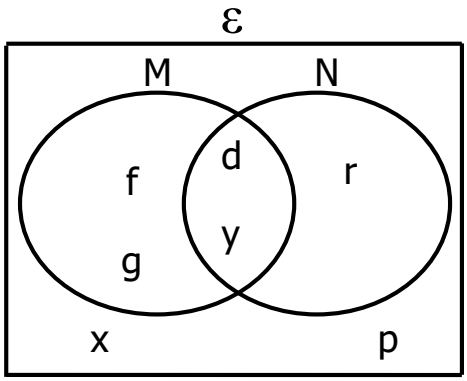
$0.009 \div 10^{-2} = 0.9$

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

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

M_1 for any correct working
A_1 for 9×10^{-3}

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



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

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

M_1 for listing elements
A_1 for counting and writing five elements.

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

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

$\cap (DC) = 4$

$\cap (TC) = 12 + 4 = 16$

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

M_1 for finding n(TC) as 16
A_1 for $\frac{4}{16}$, $\frac{1}{4}$, $\frac{2}{8}$

9. Find the expanded number: $(5\times10^{2})+(5\times10^{-2})$

$(5\times10^{2}) + (5\times10^{-2})$

$(5\times10\times10) + \left(5 \times \frac{1}{10^{2}}\right)$

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

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

500+0.05

500.00

$\underline{+\ 0.05}$

$\underline{500.05}$

M_1 for correct working
A_1 for 500.05
Encourage learners to show the necessary steps.

$500 + \frac{}{100}$

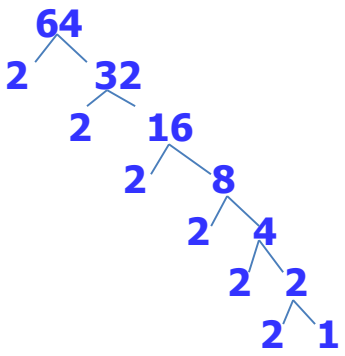
10. Work out: 3 – 5 = p (finite 7)

3 – 5 = P (finite 7)
P = (3 + 7) – 5 (finite 7)
P = 10 – 5 (finite 7)
P = 5(finite 7)

M_1 for P=(3+7) -5 (finite 7)
A_1 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
n(y) = 6



M_1 for $2^n = 2^6$
A_1 for n(y) = 6

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

Day + (38 – 1) = - (finite 7)
1 + 37 = - (finite 7)
38 = - (finite 7)
$\frac{38}{7} = 5\ pem\ ③$
38 = 3 (finite 7)
The midterm exam started on Wednesday

M_1 for correct working.
Accept the use of a calendar.
A_1 for Wednesday.

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

$\frac{1}{2}\ of\ 24 - (3 \times 4) + 5$
BODMAS
$\left(\frac{1}{2}\ 0f\ 24\right) - 12 + 5$
$\frac{1}{2} \times \cancel{24}^{12} - 12 + 5$
12 – 12+5
(12 + 5) – 12

M_1 for correct working up to 12-12+5.
A_1 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

1st no × 2nd no = LCM × GCF

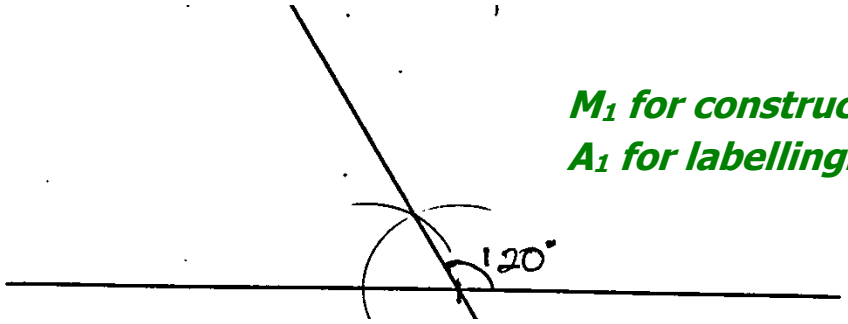
36 × y = 180 × 6

$$\frac{\cancel{36} \times y}{\cancel{36}} = \frac{\cancel{180}^{30} \times \cancel{6}}{\cancel{36}_{6}}$$

$y = 30$

M_1 for correct substitution and division.
A_1 for 30.

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



M_1 for construction.
A_1 for labelling.

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

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

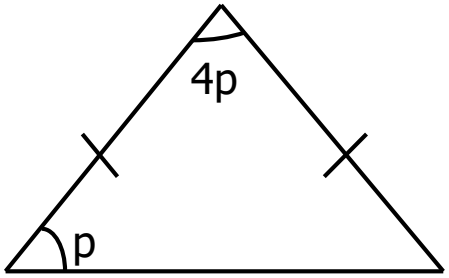
$$= n^{(5+3)-6}$$

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

$= n^2$

M_1 for any correct working.
A_1 for n^2.

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



P + P + 4P = 180°

6P = 180°

$$\frac{\cancel{6}p}{\cancel{6}} = \frac{\cancel{180}^{30}}{\cancel{6}}$$

P = 30°

M_1 for correct equation.
A_1 for 30^0.

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

M_1 for adding.
A_1 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
$\frac{3y}{3} = \frac{15^5}{3}$
Y = 5

M_1 for correct equation.
A_1 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?

No of papers = $\frac{No\ of\ pages}{2}$
No of pags = (16 – 7)+ 1
= 9 + 1
= 10
No of pags = $\frac{10}{2} = 5$
Akello read 5 papers

M_1 for 10 pages.
A_1 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)

$\frac{3}{4} + \frac{1}{16} \div \frac{1}{4}$ **BODMAS**
$\frac{3}{4} + \left(\frac{1}{16} \div \frac{1}{4}\right)$
$\frac{3}{4} + \left(\frac{1}{\cancel{16}_4} \times \frac{4}{1}\right)$
$\frac{3}{4} + \frac{1}{4}$

M_1 for $\frac{3}{4} + \frac{1}{4}$
A_1 for 1.
Reject 4 since its not simplified

4

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

(b) Work out: $\frac{0.28 \times 3.6}{0.7 \times 0.6}$ (02 Marks)

(0.28 × 3.6) ÷ (0.7 × 0.6)

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

$\frac{\cancel{28}^{4}}{\cancel{100}} \times \frac{\cancel{36}^{6}}{10} \times \frac{\cancel{10}}{\cancel{7}_{1}} \times \frac{\cancel{10}}{\cancel{6}_{1}}$

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

M_1 for changing decimals into fractions.
A_1 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

1st no	2nd no	3rd 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

$\frac{\cancel{3}n}{\cancel{3}} = \frac{\cancel{18}^{6}}{\cancel{3}}$

n=6

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

M_1 for correct equation.
M_1 for n=6
A_1 for second number 8
A_1 for third number 10
Encourage learners to show all steps when solving an equation.

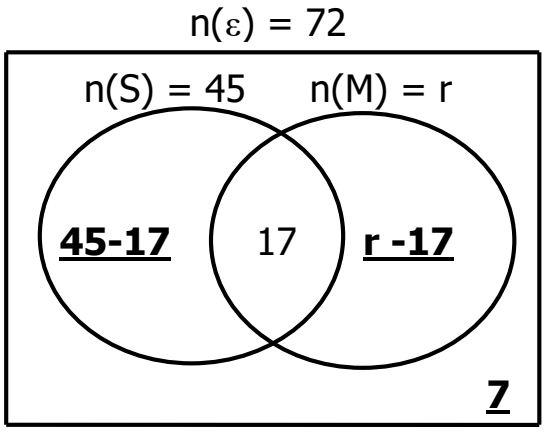
(b) the product of the numbers. (01 Mark)

6×8×10
48×10
480

A_1 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 wit both drinks while 7 guests did not turn up.

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



B_1 for 45-17 or 28.
B_1 for r-17
B_1 for 7
Reject if a leaner 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

M_1 for correct equation.
M_1 for collecting like terms.
A_1 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 × L = Area
L^2 = 2.25cm^2
$\sqrt{L^2} = \sqrt{2.25cm^2}$
$L = \frac{\sqrt{225}}{100} \times \sqrt{cm^2}$
$L = \frac{15}{10} cm$
L = 1.5cm

M_1 for the square root of 225=15
M_1 for the square root of 100=10
A_1 for L=1.5

(b) perimeter of the paper. (01 mark)

P = 4 × L

= 4 × 1.5cm

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

A_1 for 6cm

$\frac{60}{10}$

= 6 cm

25. (a) Change 2012_{three} to base ten. (02 Marks)

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

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

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

54 + 3 + 2

59_{ten}

M_1 for expansion using powers of 3

A_1 for 59_{ten}

(b) Find the unknown base m: $43_m = 102_{five}$. (03 Marks)

$43_m = 102_{five}$

$4^{m^1}3^{m^0} = 1^{5^2}0^{5^1}2^{5^0}$

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

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

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

4m = 24

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

m = 6

m is base six

M_1 for 4m+3=27

M_1 for m=6

A_1 for base six

Encourage learners to write base names in words.

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)

$sh.\overline{26,000}^{6500}$
$\overline{4}$

Sh 6500

A_1 for Sh 6500

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

cost of 1 book

$shs\ \overline{15600}^{1300}$
$\overline{12}$

Sh 1300

M_1 for unit cost of the book Sh 1300
A_1 for total cost of seven books (Sh 9100)

Cost of 7 books
Sh 1300
× 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

M_1 for Sh 47,600
A_1 for Sh 50,000
A_1 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 reminder o others. He saved sh 270,000.

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

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

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

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

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

$= \frac{2}{4}$

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

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

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

$\frac{4^{1}}{\cancel{12}_{3}}$

$\frac{1}{3}$

M_1 for $\frac{2}{4}$ or $\frac{1}{2}$ as a remainder.

M_1 for $\frac{2}{12}$ or $\frac{1}{6}$ for others

A_1 for $\frac{1}{3}$ for saving.

Follow through the learner's work.

(b) Calculate his salary? (02 Marks)

Let his salary be n

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

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

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

shs 270000

× 3

***n* =Shs 810,000**

M_1 for correct equation.

A_1 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

$\frac{shs\ 1,280,000}{sh\ 40,000}$

$\frac{\cancel{128}^{32}}{4}$

32 girls

M_1 for dividing correctly.

A_1 for 32 girls.

(b) How much money did the boys pay altogether? (02 Marks)

No of boys

5 8

-3 2

2 6 boys

M_1 for 26 boys

Amount paid by boys

Sh 4500

× 26

27000

+ 9000

Sh 117,000

A_1 for Sh 117,000

Encourage learners to show how they multiplied.

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

Sh 1, 280,000

+sh 117,000

Sh 1, 397,000

B_2 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

2×2×3×5

45×15

60 minutes

Both bells will ring together every 60 minutes

M_1 for prime factorization.

A_1 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

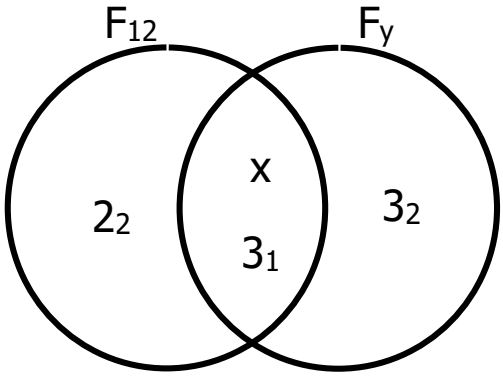
9: 00am

B_1 for 8:00am

A_1 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)

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

$12 = 2 \times 3 \times x$

$12 = 6x$

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

x = 2

M_1 for obtaining $6x = 12$

A_1 for $x=2_1$

Reject without subscript.

(ii) y (02 Marks)

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

$y = 2 \times 3 \times 3$

$y = 6 \times 3$

y = 18

M_1 for $y=2x3x3$

A_1 for $y=18$

(b) Work out the LCM of 12 and y (01 Mark)

LCM = product of the union set

LCM = $2 \times 2 \times 3 \times 3$

$= 4 \times 9$

= 36

A_1 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)

Speed = D ÷ T
D = 290km
Time = 12 00
- 7 00
5 00 hours

$$Speed = \frac{290km}{8\ hours}$$

= 58km/hr

M_1 for 5 hours
B_1 for dividing 290 by 8hrs
A_1 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)

Arrival time = dep time + Duration

Dep time = 5:00pm

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

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

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

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

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

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

4 hours and 50 minutes

A.T = 5 : 00

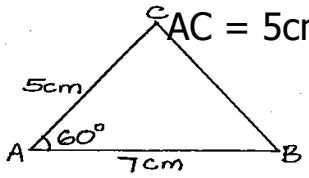
+4 : 50

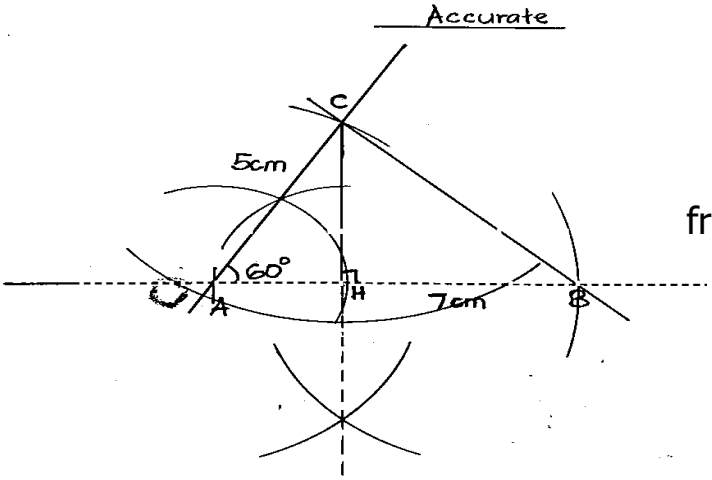
9: 50pm

M_1 for $4\frac{5}{6} hrs$
B_1 for 4hrs and 50 mins
A_1 for 9:50pm

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 = 60^0 and side AC = 5cm. (04 Marks)





S_1
C_1
L_1
L_1
L_1

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

END