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# EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level



## Mathematics

4024/1

Paper 1

Friday

10 JULY 2026

Additional materials:  
Geometrical instruments

Time: 2 hours

Marks: 80

### Instructions to Candidates

- 1 Write the **centre number** and your **examination number** in the spaces provided on this page.
- 2 Write your **examination number** in the spaces provided on **every page** of this question paper.
- 3 There are **twenty-three** questions in this paper.
- 4 Answer **all the** questions.
- 5 Write your answers in the **spaces provided** in this question paper.
- 6 If working is needed for any question, it must be shown in the space below that question.
- 7 **Omission of essential working** will result in loss of marks.
- 8 **Electronic calculators and mathematical tables should not be used** in this paper.

### Information for Candidates

- 1 No paper for rough work is to be provided.
- 2 The number of marks is given in brackets [ ] at the end of each question or part question.
- 3 Cell phones are **not allowed** in the examination room.

| For Examiners' Use Only |               |                     |
|-------------------------|---------------|---------------------|
| Question                | Mark obtained | Examiner's Initials |
| 1                       |               |                     |
| 2                       |               |                     |
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For  
Examiner's  
use

1 Evaluate  $\left(\frac{27}{64}\right)^{\frac{1}{3}}$ .

Answer: ..... [2]

2 Factorise completely  $pq - 3p - q^2 + 3q$ .

Answer: ..... [2]

3 Simplify  $8x + 4 - 3(2x - 3)$ .

Answer: ..... [2]

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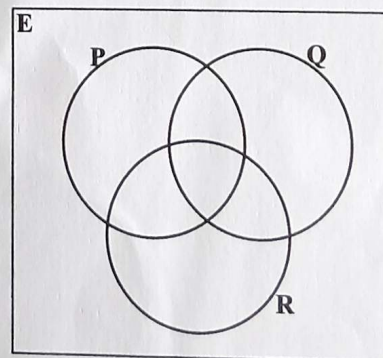
- 4 Solve the equation  $2x^2 - 72 = 0$ .

For  
Examiner's  
use

Answer:  $x = \dots\dots\dots$  or  $\dots\dots\dots$  [2]

- 5 Shade  $(P \cup Q)' \cap R$  on the diagram in the answer space below.

Answer:



[2]

|                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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- 6 The market value of a share is K25.00. How many shares can be bought from K25 250.00?

For  
Examiner's  
use

Answer: ..... [2]

- 7 The first and seventh terms of an arithmetic progression are  $-11$  and  $13$  respectively. Find the
- (a) common difference,  $d$ ,
  - (b)  $n$ th term.

Answer: (a) ..... [1]

(b) ..... [2]

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- 8 (a) The following cards are placed in a box.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|

If a card is selected at random from the box, find the probability that the number on the card is a prime number.

- (b) If A is the point (1, 1) and  $\vec{AB} = \begin{pmatrix} 6 \\ 5 \end{pmatrix}$ , find the coordinates of B.

Answer: (a) ..... [1]

(b) ..... [2]

- 9 Given that matrix  $A = \begin{pmatrix} 3 & 4 \\ -1 & 0 \end{pmatrix}$  and matrix  $B = \begin{pmatrix} -1 \\ 3 \end{pmatrix}$ , find

(a)  $A^T$ ,

(b)  $AB$ .

Answer: (a) ..... [1]

(b) ..... [2]

| Examination Number |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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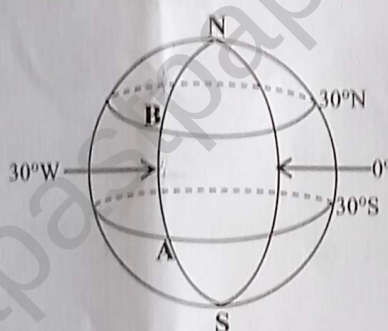
- 10 (a) Given that  $R = \{x; 0 \leq x \leq 10, x \text{ is an even number}\}$ , list the elements of set  $R$ .
- (b) A point  $F(-4, 1)$  is mapped onto a point  $G(5, -4)$  by a translation  $T$ . Express  $T$  as a column vector.

For  
Examiner's  
use

Answer: (a) ..... [1]

(b) ..... [2]

- 11 In the following diagram, NS is the Prime Meridian. The positions of towns A and B are  $(30^\circ\text{S}, 30^\circ\text{W})$  and  $(30^\circ\text{N}, 30^\circ\text{W})$  respectively.



- (a) Find the distance between A and B in nautical miles.
- (b) If the local time at B is 09 35 hours, what is the local time at the Prime Meridian?

Answer: (a) ..... [1]

(b) ..... [2]

| Examination Number |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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For  
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- 12 The absolute error of a number  $n$  is 5 and the relative error for the same number is 0.2. Find the

- (a) value of  $n$ ,  
(b) percentage error.

Answer: (a) ..... [2]

(b) ..... [2]

- 13 (a) Triangle ABC below is right angled at B, BCD is a straight line and

$$\cos \hat{ACD} = -\frac{12}{13}$$



Find the value of  $\sin \hat{CAB}$ .

- (b) Find  $\int \left( \frac{12}{x^3} - 3x^2 \right) dx$ .

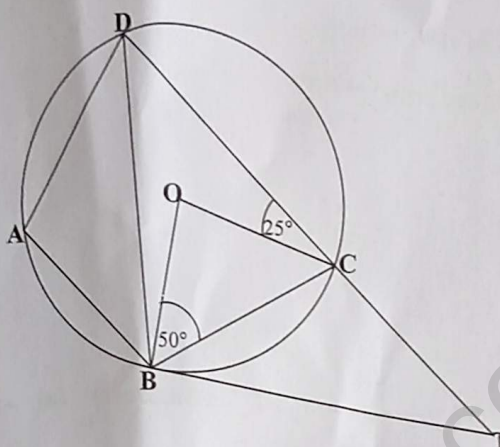
Answer: (a) ..... [2]

(b) ..... [2]

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- 14 The points A, B, C and D are on the circumference of a circle centre O such that angle  $OBC = 50^\circ$  and angle  $OCD = 25^\circ$ . BT is a tangent to the circle at B.

For  
Examiner's  
use



Find angle

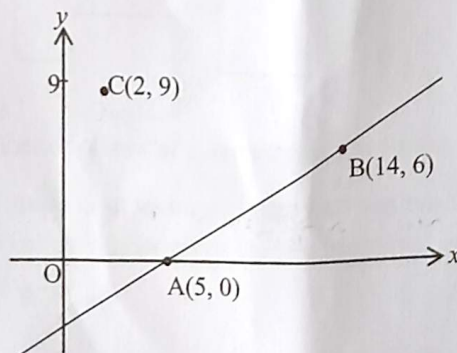
- (a) BDC,
- (b) BAD,
- (c) BTD.

Answer: (a) ..... [1]  
 (b) ..... [1]  
 (c) ..... [2]

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For  
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use

- 15 (a) Two buckets A and B are geometrically similar. The height of bucket A is 20cm and that of bucket B is  $y$  cm. Given that the volumes of bucket A and bucket B are  $1\,000\text{cm}^3$  and  $8\,000\text{cm}^3$  respectively, find the value of  $y$ .
- (b) The following diagram shows a straight line AB passing through the points A(5, 0) and B(14, 6). C is a point (2, 9).



Find the equation of the line perpendicular to AB that passes through the point C.

Answer: (a) ..... [2]

(b) ..... [2]

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16 P varies as  $q$  and inversely as the square of  $r$  and when  $p = 6$ ,  $q = 18$  and  $r = 3$ .

Find the

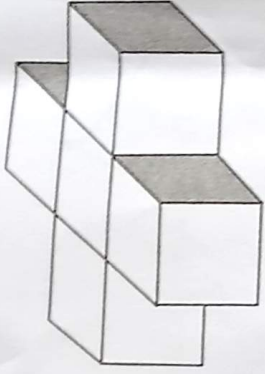
- (a) value of  $k$ , the constant of variation,
- (b) value of  $q$  when  $p = 9$  and  $r = 5$ ,
- (c) values of  $r$  when  $p = 3$  and  $q = 25$ .

For  
Examiner's  
use

Answer: (a) ..... [1]  
 (b) ..... [1]  
 (c)  $r$  ..... or ..... [2]

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17 (a) The following figure is made up of five identical cubes.



State the number of planes of symmetry for the figure.

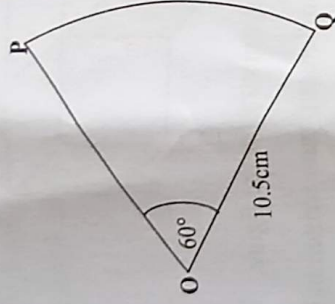
(b) In the answer space is an incomplete program written in Pseudocode for calculating the volume ( $v$ ) of a cylinder given the height ( $h$ ) and radius ( $r$ ). Complete the program. [ $v = \pi r^2 h$ ].

Answer: (a) ..... [2]  
 (b) Start  
     Enter ..... [1]  
      $v =$  ..... [1]  
     Output v  
     Stop

|                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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- 18 (a) The diagram shows a sector of a circle with centre O and radius 10.5cm. Angle POQ =  $60^\circ$ .



Find the area of the sector.  $\left[ \pi = \frac{22}{7} \right]$

- (b) The points P and Q have coordinates (3, 6) and (-9, 4) respectively. Find the coordinates of the midpoint of PQ.

Answer: (a) ..... [2]

(b) ..... [2]

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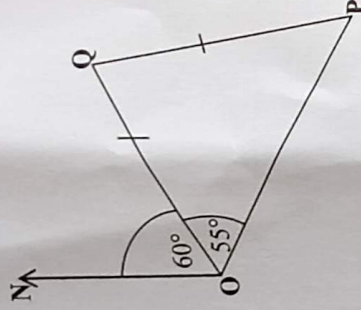
19 Given that  $f(x) = \frac{2}{x-9}$  and  $g(x) = x+5$ , find

- (a)  $f^{-1}(x)$ ,
- (b)  $fg(x)$ ,
- (c) the value of  $x$  for which  $fg(x) = 1$ .

Answer: (a) ..... [1]  
 (b) ..... [1]  
 (c) ..... [2]

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- 20 In the following diagram, angle  $POQ = 55^\circ$ ,  $OQ = QP$  and the bearing of  $Q$  from  $O$  is  $060^\circ$ .



Find the bearing of

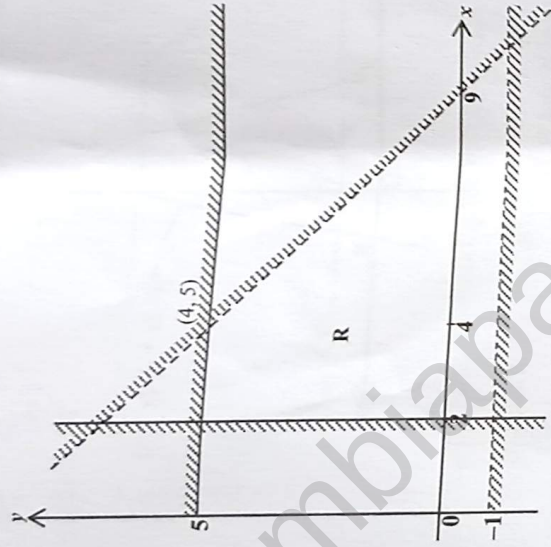
- (a) O from Q,  
(b) P from Q.

Answer: (a) ..... [2]

(b) ..... [2]

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- 21 Write the four inequalities that define the unshaded region R on the XOY plane below.



Answer: .....

.....

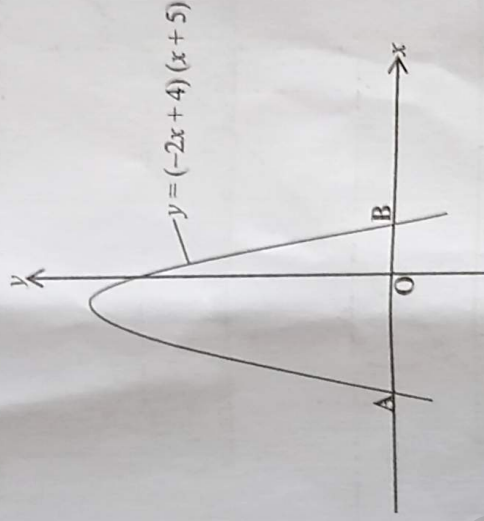
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..... [5]

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22 (a) Solve the equation  $4^{3x} = 8$ .

(b) The following diagram shows a sketch of the graph of  $y = (-2x + 4)(x + 5)$ .



Find the

- (i) coordinates of A and B,
- (ii) maximum value of  $y$ .

Answer: (a) ..... [2]

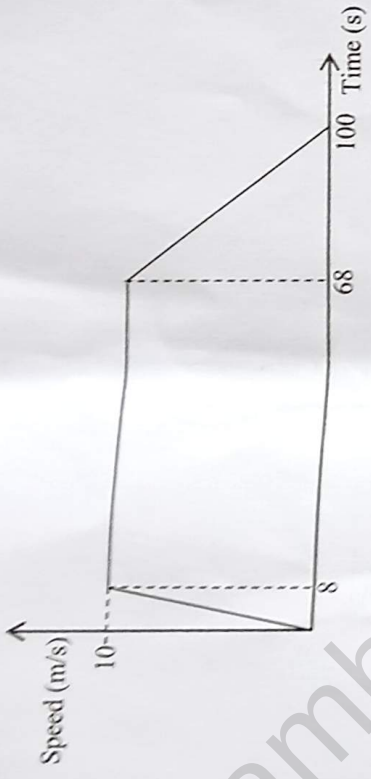
(b) (i) A( , ), B( , ) [2]

(ii) ..... [2]

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For  
Examiner's  
use

- 23 The following diagram shows the speed-time graph of a particle which starts from rest and accelerates uniformly to a speed of 10m/s in 8 seconds. It then travels at a constant speed for 60 seconds before decelerating uniformly to rest in a further 32 seconds.



- Find the
- (a) acceleration of the particle during the first 8 seconds,
  - (b) total distance covered by the particle,
  - (c) speed of the particle at  $t = 84$  seconds.

Answer: (a) ..... [1]  
 (b) ..... [2]  
 (c) ..... [3]