Centre Number	Candidate Number

Candidate Name _____

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Mathematics

4024/1

Paper 1

Wednesday **31 OCTOBER 2018**

Candidates answer on the question paper
Additional materials:
Geometrical instruments

Time: 2 hours

Instructions to Candidates

Write your **name**, **centre number** and **candidate number** in the spaces provided at the top of this page.

There are **twenty-three** questions in this paper.

Answer **all** questions.

Write your answers in the **spaces provided** on the question paper.

If working is needed for any question, it must be shown in the space below that question.

No paper for rough work is to be provided.

Omission of essential working will result in loss of marks.

Electronic calculators and mathematical tables should not be used in this paper.

Cell phones are not allowed in the examination room.

Information for Candidates

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 80.

For Examiner's Use

For Examiner's use

1 Find the value of $x^0 \times 2^3$.

Answer: ..... [2]

2 Factorise completely $18 - 2x^2$.

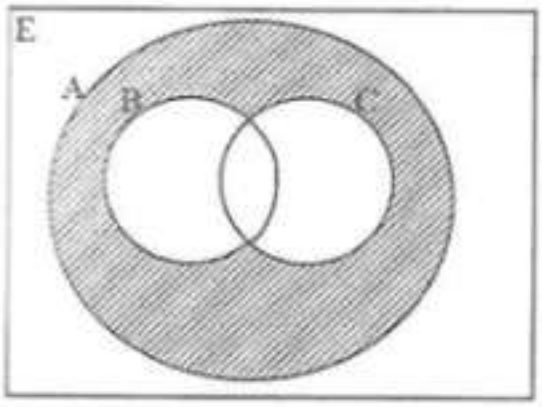
Answer: ..... [2]

3 Z is a point (−1, 8) and M is a point (2, 12). Find the magnitude of $\overrightarrow{ZM}$.

Answer: ..... [2]

For Examiner's use

4 Use set notation to describe the shaded region in the diagram below.



Answer: ..... [2]

5 Floyd had 125 shares in a company. At the end of a financial year, the company declared a dividend of K3.00 per share. How much was due to Floyd?

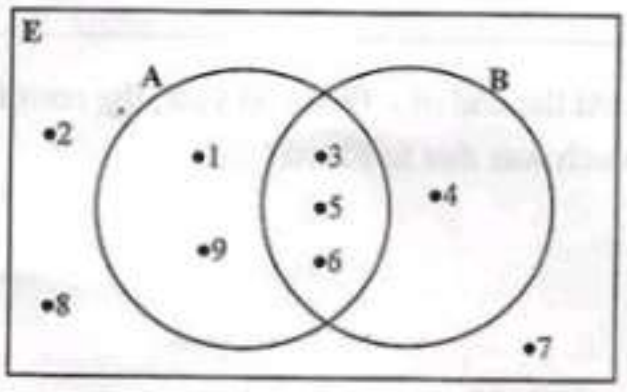
Answer: ..... [2]

For Examiner's use

6 A cylinder with diameter 2 cm has a volume of 5 cm^3. Find the volume of a similar cylinder with diameter 8 cm.

Answer: ..... [2]

7 (a) The Venn diagram below shows sets A and B. List $A' \cap B$.



(b) Express $\begin{pmatrix} 1 & 4 & 0 \\ 2 & 1 & 1 \\ 3 & 2 & 4 \end{pmatrix} \begin{pmatrix} -1 & 4 & 5 \\ 2 & 2 & 3 \\ 0 & 1 & -2 \end{pmatrix}$ as a single matrix.

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

(b) ..... [2]

For Examiner's use

8 For an arithmetic progression 16, 25, 34, 43, 52, ……., write down the

(a) next term,

(b) nth term.

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

(b) ..... [2]

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9 A plane leaves a town P(0°, 30°W) and flies due East to a town Q(0°, 50°E) in 3 hours. The distance between P and Q is 4 800 nm.

(a) Calculate its average speed.

(b) If the plane leaves P at 06 00 hours, what time will it arrive at Q?

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

(b) ..... [2]

For Examiner use

10 (a) Given that matrix $M = \begin{pmatrix} 3 & -1 & 0 \\ -2 & 1 & 3 \\ 0 & -1 & 2 \end{pmatrix}$, find M^T.

(b) Expand and simplify $(c + 3)^2$.

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

(b) ..... [2]

11 (a) A box contains 5 green, 3 yellow and 6 red beads of the same type. Find the probability of picking a yellow bead at random from the box.

(b) Find the equation of a straight line passing through (1, 5) and (2, 10).

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

(b) ..... [2]

For Examiner's use

12 y varies directly as the square of x and $y = 96$ when $x = 4$.
Find the

(a) value of the constant k,

(b) value of y when $x = 5$,

(c) values of x when $y = 24$.

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

(b) ..... [1]

(c) $x =$ .....or $x =$..... [2]

For Examiner's use

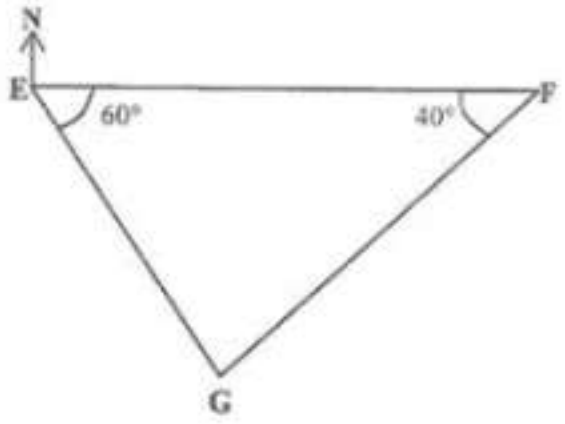
13 (a) Solve the equation $2x^2 = 8$.

(b) The mass (m) of a bag of mealie meal is 25 kg. Complete the statement in the answer space.

Answer: (a) $x =$.....or $x =$..... [2]

(b) .....$\leq m <$..... [2]

14 In the diagram below, F is due east of E, angle GEF = 60° and angle EFG = 40°.



Calculate the bearing of

(a) F from G,

(b) E from G.

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

(b) ..... [2]

For Examiner's use

15 (a) The point (5, 2) is the midpoint of a straight line joining A(x, 9) and B(3, y). Find the value of x and the value of y.

(b) The length of a line is 8 cm. If this is recorded as 8.2 cm, calculate the percentage error.

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

(b) ..... [2]

16 Given that $f(x) = 2x - 5$ and $g(x) = x + 3$,

Find

(a) $f^{-1}(x)$,

(b) $f^{-1}(-10)$,

(c) $gf(3)$.

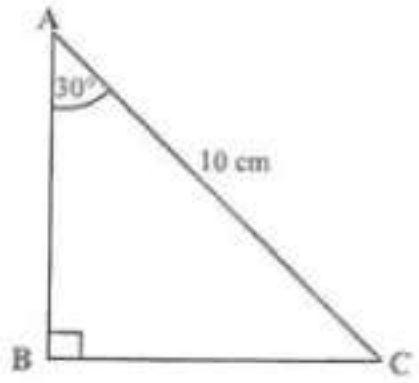
Answer: (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

17 (a) Given that $y = 2x^3 - 5x^2 + 4x + 2$, find $\frac{dy}{dx}$.

(b) In the diagram below, AC = 10 cm, angle ABC = 90° and angle BAC = 30°.



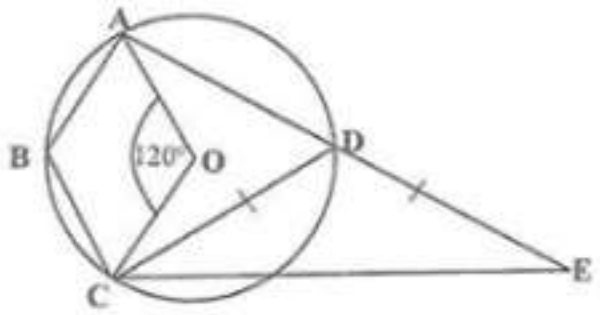
Calculate BC.

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

(b) ..... [2]

For Examiner's use

18 In the diagram below, O is the centre of the circle. A, B, C and D are points on the circumference. AD produced meets the line from C at E such that CD = DE and angle AOC = 120°.



Calculate angle

(a) ADC,

(b) ABC,

(c) DEC.

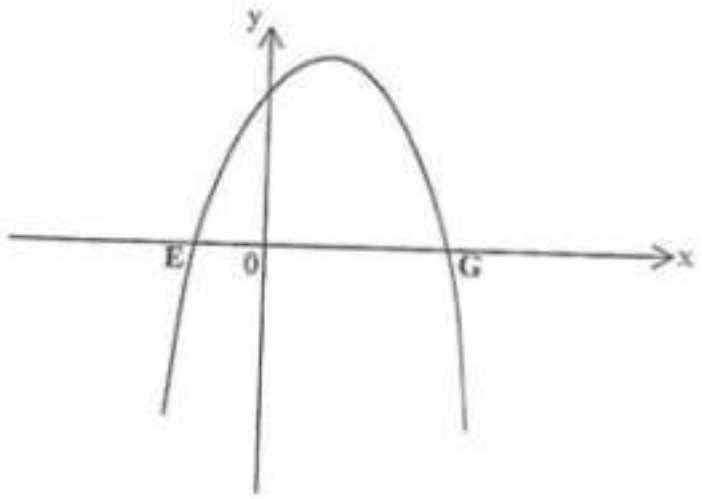
Answer: (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

For Examiner's use

19 The diagram below shows a sketch of the graph of $y = 2 + x - x^2$ passing through the points E and G.



Find the

(a) coordinates of E and G,

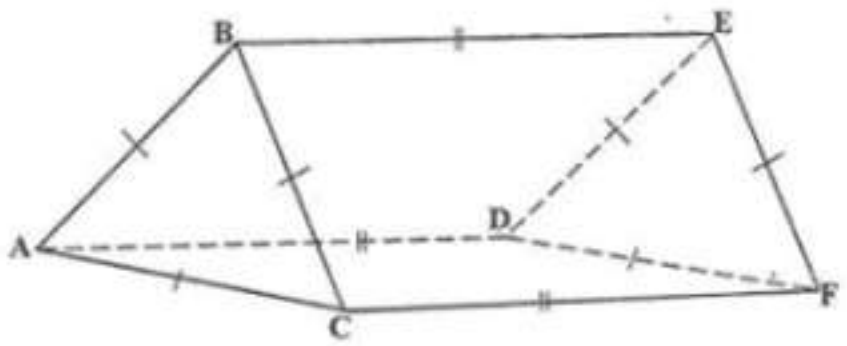
(b) maximum value of y.

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

(b) ..... [2]

For Examiner's use

20 **(a)** The diagram below shows a triangular prism with AB = BC = AC = DE = EF = DF and AD = BE = CF.



State the number of planes of symmetry of the prism.

(b) In the answer space below is an incomplete program in pseudo code to calculate the circumference of a circle of latitude x°, given the radius R of the earth. Complete the program by filling in the blank spaces with appropriate statements.

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

(b) Begin

Enter.....

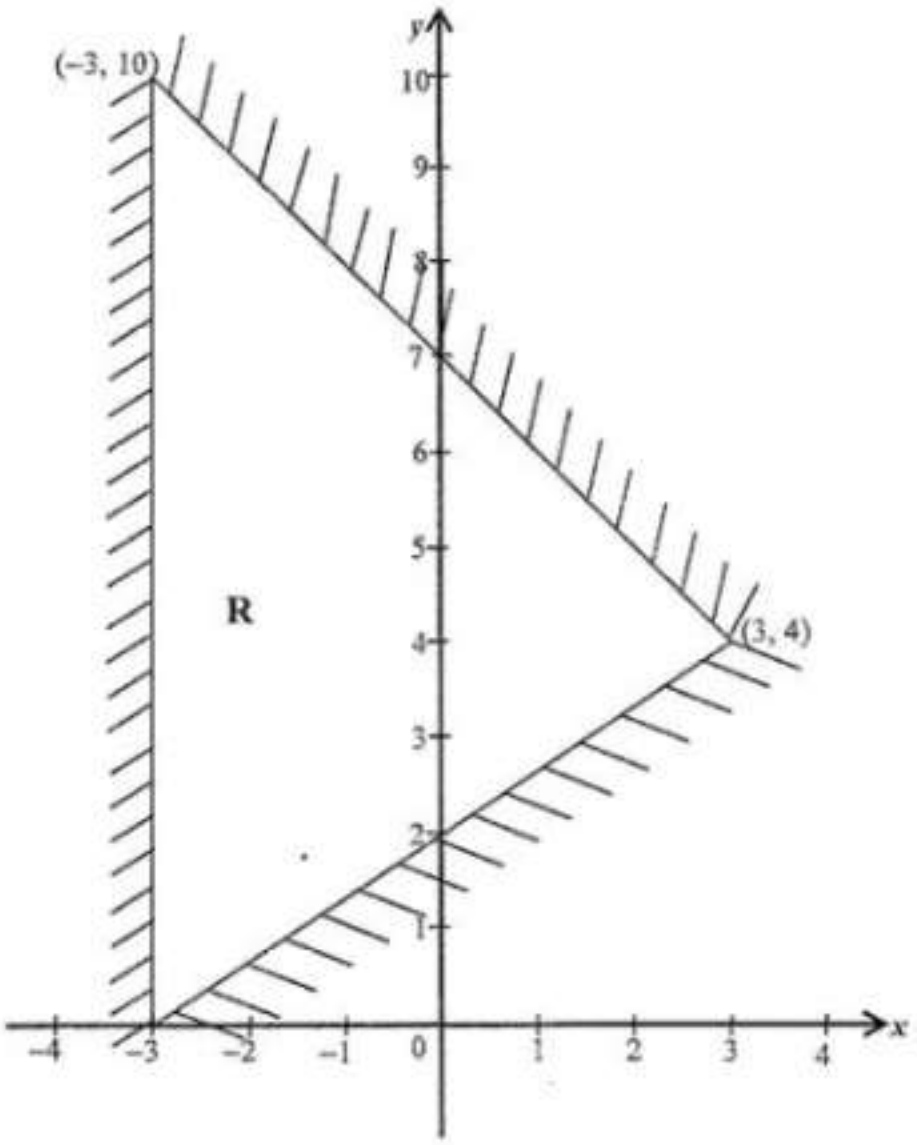
C = ...

Output C

End. [2]

For Examiner's use

21 On the XOY plane below, region R is unshaded.



Write the three inequalities that define the region R.

Answer: .....

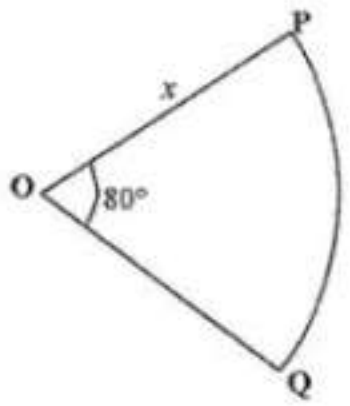
.....

..... [5]

For Examiner's use

22 **(a)** Solve the equation $x^{\frac{1}{3}} = 4$.

(b) In the diagram below, OPQ is a sector of a circle whose centre is O, radius x cm and angle POQ = 80°.



Given that the area of the sector OPQ is 308 cm^2, calculate the value of x. $\left[\pi = \frac{22}{7}\right]$

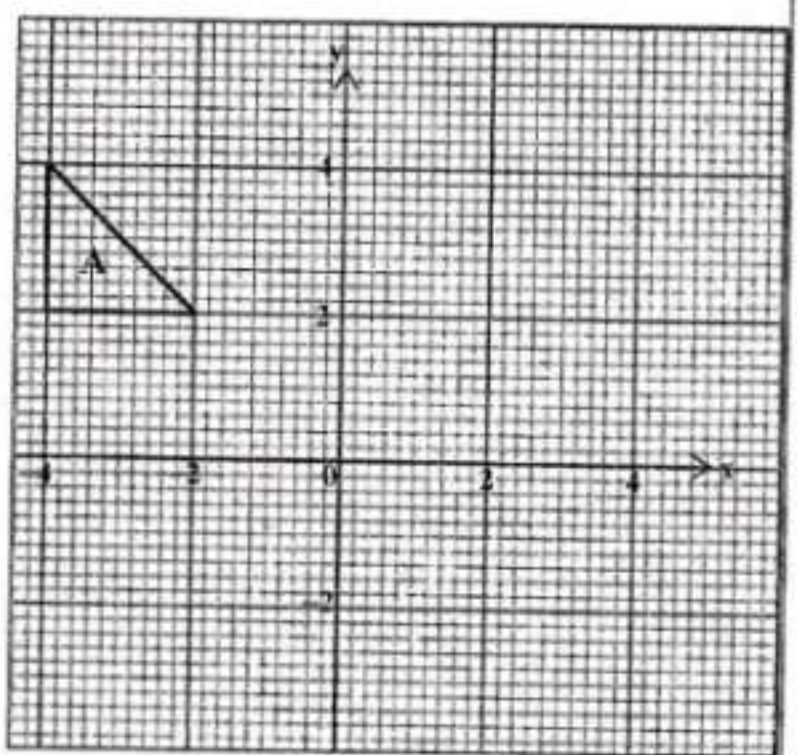
(c) The diagram below shows ΔA. If ΔA is mapped onto ΔB by a translation $T = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$, draw ΔB on the diagram in the answer space below.

Answer:

(a) ..... [2]

(b) ..... [2]

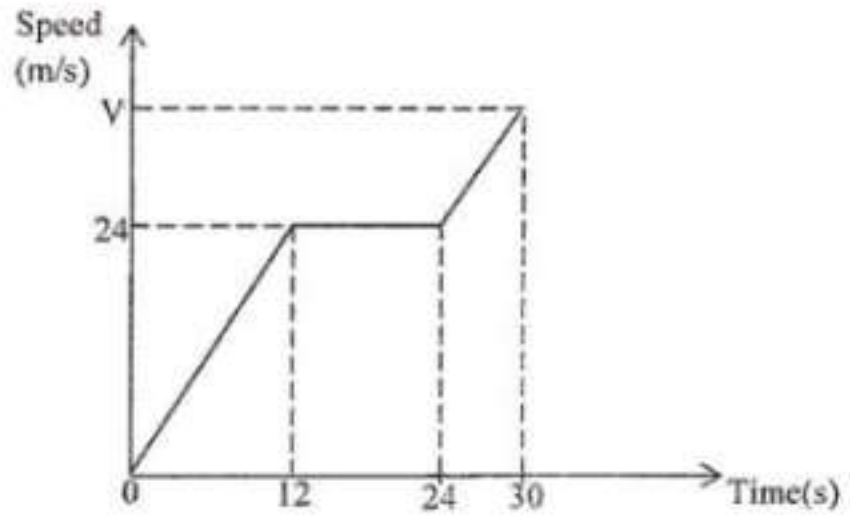
(c)



[2]

For Examiner's use

23 The diagram below is a speed-time graph of a particle which accelerates uniformly from rest for 12 seconds until it reaches a speed of 24 m/s. It moves at a constant speed for a further 12 seconds before it accelerates uniformly for another 6 seconds to a speed of V m/s.



(a) Calculate its acceleration for the first 12 seconds.

(b) Find the distance which the particle covered in the first 24 seconds.

(c) Given that the total distance covered was 600 m, calculate the value of V.

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

(b) ..... [2]

(c) ..... [3]