



1 Evaluate  $(-1)^6 \times 2^3$ .

ANSWER: ..... [2]

2 Solve the equation  $(x - 1)(2x + 5) = 0$ .

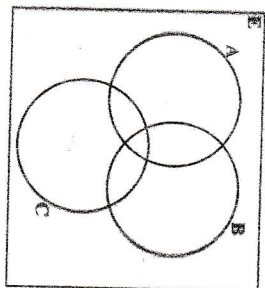
ANSWER: ..... [2]

3 Simplify  $4x^2 + 2y^2 - xy - 6x^2 + 2xy$ .

ANSWER: ..... [2]

4 Shade  $(A \cup C) \cap B$  in the Venn diagram in the answer space.

ANSWER:



[2]

5 Factorise completely  $4ab + 6ac - 6bd - 9cd$ .

ANSWER: ..... [2]

6 A company declared a dividend of K1.50 per share. Musatala has 600 shares in the company. How much will she get?

ANSWER: ..... [2]

Turn over

- 7 (a) Given that  $17 + m + 27 + \dots$  are consecutive terms of an Arithmetic Progression, find the arithmetic mean,  $m$ .  
 (b) For the sequence  $1, 13, 15, \dots$ , find the formula for the  $n^{\text{th}}$  term.

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

- 8 (a) The transpose of a matrix  $A$  is  $\begin{pmatrix} -1 & 4 & 5 \end{pmatrix}$ . Find the matrix  $A$ .

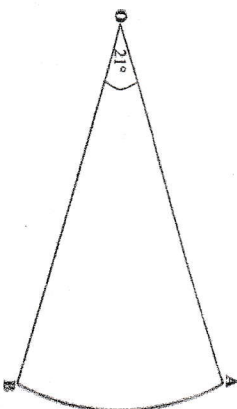
(b) Given that  $\begin{pmatrix} 1 & 2 & 3 \\ x & & 5 \end{pmatrix} = \begin{pmatrix} 24 \end{pmatrix}$ , find the value of  $x$ .

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

- 9 (a) A number is chosen at random from the set  $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ . Find the probability that it is a perfect square.  
 (b) Solve the equation  $8^x = 128$ .

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

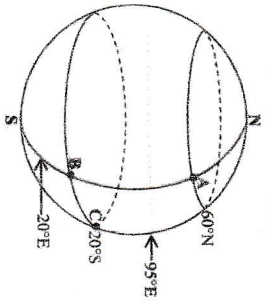
- 10 (a) Set  $A = \{\text{Prime numbers less than } 12\}$ . List set  $A$ .  
 (b) The diagram below shows a sector  $AOB$ . Arc  $AB$  subtends an angle of  $21^\circ$  at the centre  $O$ .



Given that the area of the sector is  $14.85 \text{ cm}^2$ , calculate the radius. [ $\pi = \frac{22}{7}$ ]

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

11 The diagram below shows the positions of towns A, B and C on the earth's surface.



- (a) If it is 08:20 at A, what time is it at C?
- (b) A plane flies from A to B at a speed of 400 knots. How long does the journey take if  $AB = 4\ 800$  nm?

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

(b) ..... [2]

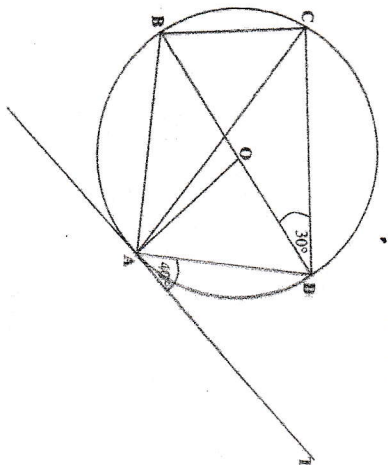
12 The length of a piece of wire is measured as 4.5 cm. Calculate

- (a) the tolerance,
- (b) the relative error.

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

(b) ..... [2]

13 In the diagram below, A, B, C and D are points on the circumference of a circle, centre O.  $\widehat{DAT} = 40^\circ$ ,  $\widehat{BDC} = 30^\circ$  and AT is a tangent to the circle at A.



- Calculate
- (a)  $\widehat{CBD}$ ,
  - (b)  $\widehat{BAC}$ ,
  - (c)  $\widehat{AOB}$ .

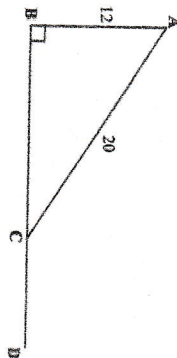
Answer: (a) ..... [1]

(b) ..... [1]

(c) ..... [2]

Turn over

- 14 (a) In the diagram below, BCD is a straight line,  $AB = 12\text{cm}$ ,  $AC = 20\text{cm}$  and angle  $ABC = 90^\circ$ .



Find the value of  $\cos \hat{ACD}$ .

- (b) A and B are points with coordinates  $(-3, 3)$  and  $(5, 9)$  respectively. Find the length AB.

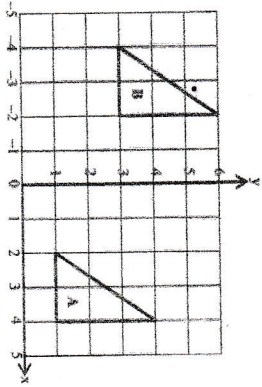
ANSWER: (a) ..... [2]  
 (b) ..... [2]

- 15  $a$  varies directly as  $b$  and as the square of  $c$  and  $a = 30$  when  $b = 2.5$  and  $c = 2$ . Find the
- (a) value of  $k$ , the constant of variation,
  - (b) value of  $a$  when  $b = 2$  and  $c = 3$ ,
  - (c) values of  $c$  when  $a = 300$  and  $b = 4$ .

ANSWER: (a)  $k =$  ..... [1]  
 (b)  $a =$  ..... [1]  
 (c)  $c =$  ..... or ..... [2]

16 (a) Find  $\int (3x^2 + 8x - 5) dx$ .

(b) The diagram below shows two triangles A and B.



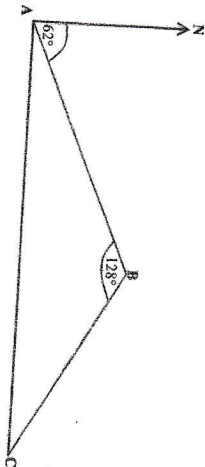
Describe fully the single transformation which maps triangle A onto triangle B.

Answer: (a) .....

(b) .....

[2]

17 In the diagram below, A, B and C are three points on level ground. The bearing of B from A is  $062^\circ$  and angle  $ABC = 128^\circ$ . C is due east of A.



Find the bearing of

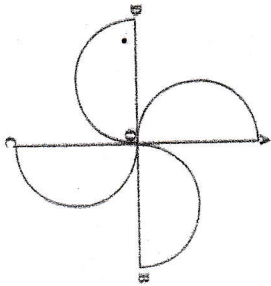
- (a) C from B,
- (b) A from C.

Answer: (a) .....

(b) .....

[2]

- 18 (a) The diagram below shows a plane figure made up of congruent semi circles. Angle AOB = 90°.



Describe fully the symmetry of the figure.

- (b) In the answer space below is an incomplete program written in pseudocode for calculating the volume  $V$  of a cuboid, given the length,  $l$ , base,  $b$ , and the height,  $h$ . Complete the program by filling in the blank spaces with appropriate statements.

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Answer: (a) ..... [2]
          (b) Begin .....
              Enter .....
              V = .....
              Output V .....
              End ..... [2]

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- 19 The functions  $f$  and  $g$  are defined by  $f(x) = 2x - 3$  and  $g(x) = 3x$ . Find

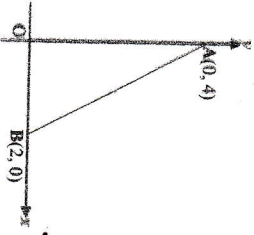
- (a)  $f^{-1}(x)$ ,  
 (b)  $gf(x)$ ,  
 (c)  $gf(2)$ .

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

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- 20 (a) In the diagram below, A is the point (0, 4) and B is the point (2, 0) and O is the origin.

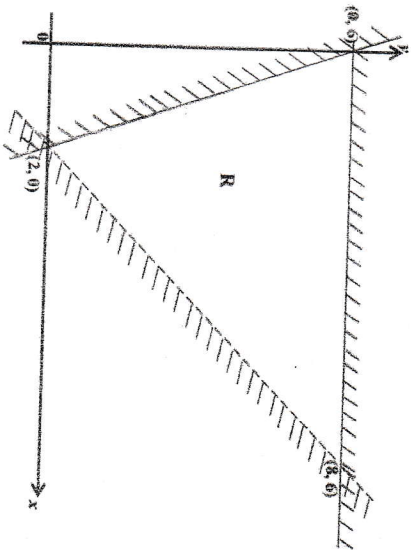


- Find the equation of a straight line through O which is parallel to the line AB.  
 (b) The heights of two similar cylinders are 4 cm and 6 cm. If the volume of the smaller cylinder is 48 cm<sup>3</sup>, find the volume of the larger cylinder.

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

For Examiner's use

- 21 Write down the three inequalities that define the unshaded region R, on the diagram below.

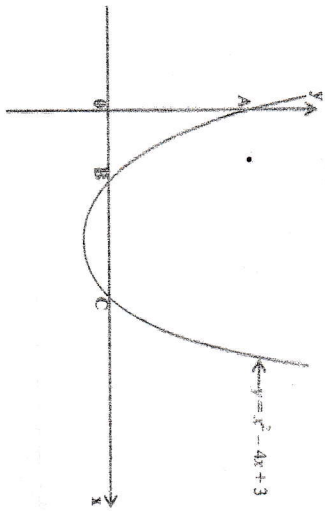


Answer: .....  
 .....  
 .....

For Examiner's use

22 (a) M is the point (0, 5) and  $\vec{MN} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ . Find  $\vec{ON}$ .

(b) The sketch shown below represents the graph of the curve  $y = x^2 - 4x + 3$ , passing through the points A, B and C.



- Find the
- (i) coordinates of the points B and C,
  - (ii) minimum value of  $y$ .

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

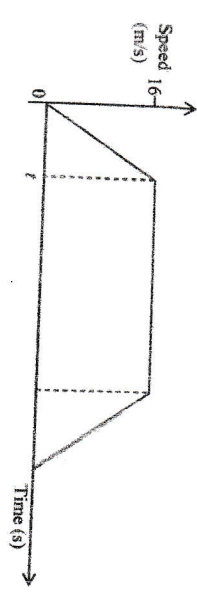
(b) (i) ..... [2]

(ii) ..... [2]

For Examiner Use

For Candidate Use

23 The diagram below is the speed time graph of a car. The car starts from rest and uniformly at  $2 \text{ m/s}^2$  for  $t$  seconds until it reaches a speed of  $16 \text{ m/s}$ . It then travels for 40 seconds, after which it comes to rest in a further 10 seconds.



- Find the
- (a) value of  $t$ ,
  - (b) distance travelled in the last 50 seconds,
  - (c) speed of the car when  $t = 53$  seconds.

ANSWER: (a) ..... [4]

(b) ..... [10]

(c) ..... [4]

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