

5. The volume of a sphere is $V = \sqrt{\frac{S^3}{36\pi}}$, where S is its surface area.

The surface area of a sphere is 500 cm^2 .

- (a) Calculate the volume of the sphere. Give your answer correct to **two decimal places**. [3 marks]
- (b) Write down your answer to (a) correct to the nearest integer. [1 mark]
- (c) Write down your answer to (b) in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbb{Z}$. [2 marks]

Working:

Answers:

- (a) _____
- (b) _____
- (c) _____



7. The diagram shows a triangle ABC in which $AC = 17$ cm. M is the midpoint of AC. Triangle ABM is equilateral.

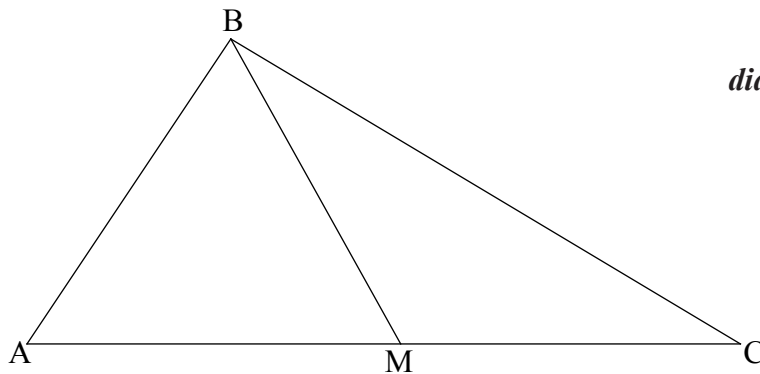


diagram not to scale

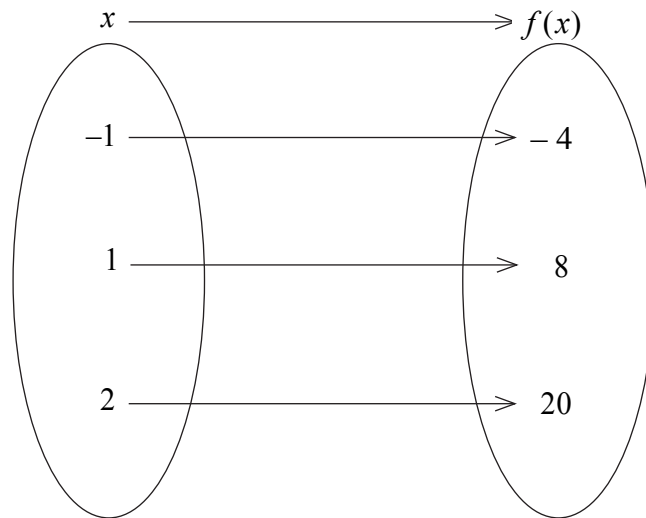
- (a) Write down
- (i) the length of BM in cm;
 - (ii) the size of angle BMC;
 - (iii) the size of angle MCB. [3 marks]
- (b) Calculate the length of BC in cm. [3 marks]

Working:

Answers:

- (a) (i) _____
- (ii) _____
- (iii) _____
- (b) _____

14. A quadratic function, $f(x) = ax^2 + bx$, is represented by the mapping diagram below.



- (a) Use the mapping diagram to write down **two** equations in terms of a and b . [2 marks]
- (b) Find the value of
- (i) a ;
- (ii) b . [2 marks]
- (c) Calculate the x -coordinate of the vertex of the graph of $f(x)$. [2 marks]

Working:

Answers:

- (a) _____

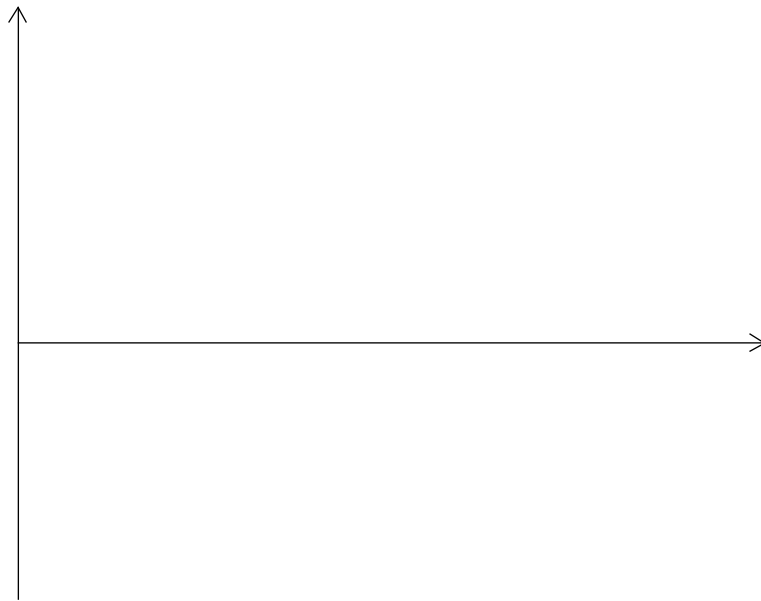
- (b) (i) _____
 (ii) _____
- (c) _____

15. The function $f(x) = 5 - 3(2^{-x})$ is defined for $x \geq 0$.

(a) (i) On the axes below sketch the graph of $f(x)$ and show the behaviour of the curve as x increases.

(ii) Write down the coordinates of any intercepts with the axes.

[4 marks]



(b) Draw the line $y = 5$ on your sketch.

[1 mark]

(c) Write down the number of solutions to the equation $f(x) = 5$.

[1 mark]

Working:

Answers:

(a) (ii) _____

(c) _____