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.

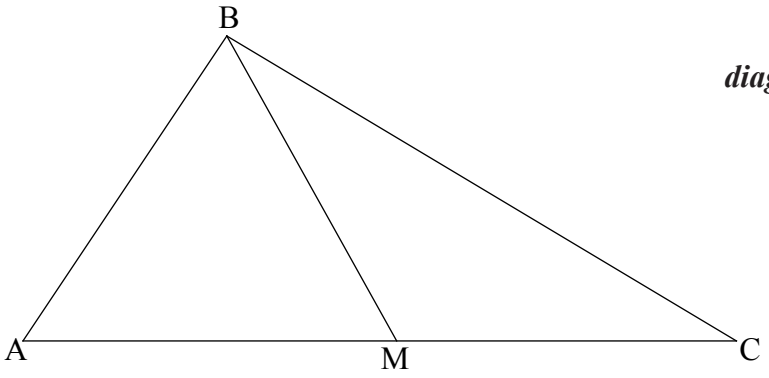


diagram not to scale

(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:

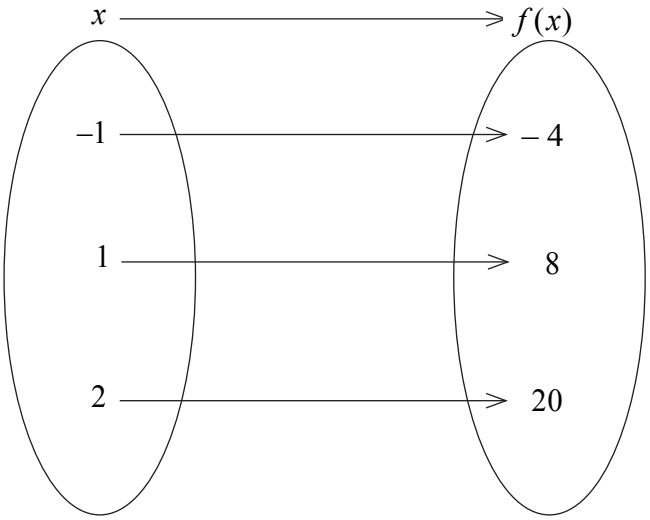
(a) (i) _____

(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) _____

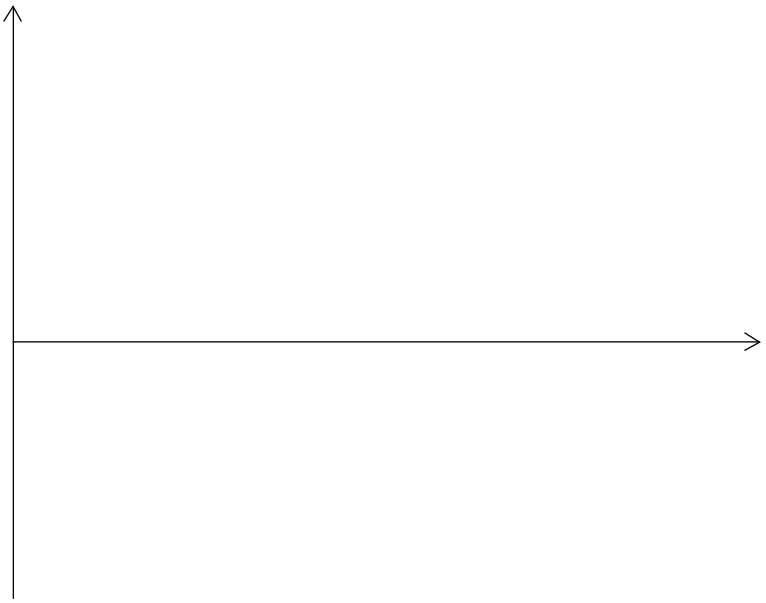
(ii) _____

(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) _____