

**Q1.**

An approximate solution to an equation is found using this iterative process.

$$x_{n+1} = \frac{(x_n)^3 - 3}{8} \text{ and } x_1 = -1$$

(a) Work out the values of  $x_2$  and  $x_3$

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$$x_2 = \dots\dots\dots$$

$$x_3 = \dots\dots\dots$$

**(2)**

(b) Work out the solution to 6 decimal places.

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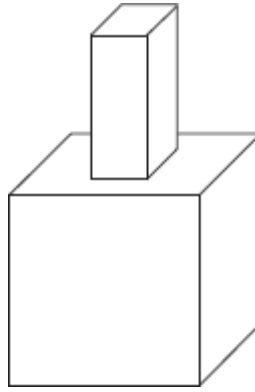
$$x = \dots\dots\dots$$

**(1)**

**(Total 3 marks)**

**Q2.**

A sculpture consists of a cuboid on top of a cube.

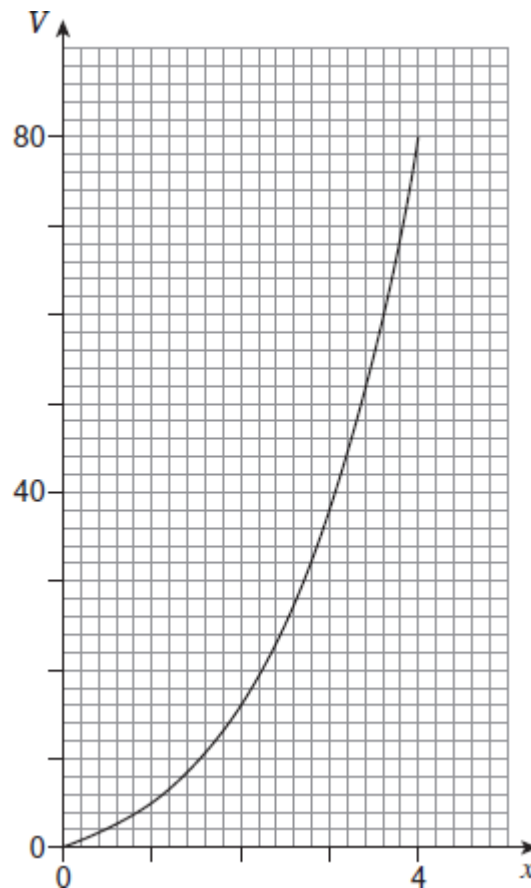


The length of the cube is  $x$  metres.

The cuboid measures 2 metres by 2 metres by  $x$  metres.

The total volume,  $V$ , in cubic metres is given by  $V = x^3 + 4x$

Here is the graph of  $V = x^3 + 4x$  for values of  $x$  from 0 to 4



- (a) The sculpture has a total volume of 50 cubic metres.

Show **on the graph** that the length of the cube is between 3 metres and 4 metres.

(2)

(b)  $x^3 + 4x = 50$

Use trial and improvement to work out the value of  $x$  to 1 decimal place.  
You **must** show your working in the table.

$x$	$x^3 + 4x$	$V$	Comment
4	$4^3 + 4 \times 4$ $= 64 + 16$	80	Too big

$x = \dots\dots\dots$

(3)  
(Total 5 marks)

**Q3.**

A storage box is a cuboid.



$x = \dots\dots\dots$  m

(Total 4 marks)

**Q4.** Use trial and improvement to find a solution to  $x^3 - 20x = 60$   
Give your answer to 1 decimal place.

$x$	$x^3 - 20x$	Comment
5	25	Too small

$x = \dots\dots\dots$

(Total 4 marks)

**Q5.** Show that the equation  $x^3 + 8x = 30$  has a solution between  $x = 2.2$  and  $x = 2.3$

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(Total 2 marks)

