Calculator

Q1.

Use the iteration $x_{n+1} = 4 - \frac{2}{x_n^2}$

to work out an approximate solution to $x = 4 - \frac{2}{x^2}$

Start with $x1 = 1$

Give your answer to 2 decimal places.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q2.

Use trial and improvement to find a solution to $x3 - 20x = 60$
Give your answer to 1 decimal place.

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

x = _____

(Total 4 marks)

Q3.

Work out an approximate solution to $x3 + 3x - 1 = 0$

Use the iteration $xn + 1 = \frac{1}{x_n^2 + 3}$

Start with $x1 = 1$

Give your answer to 2 decimal places.

_____

_____

_____

_____

_____

_____

Answer _____

(Total 3 marks)

Q4.

Show that the equation $x3 + 8x = 30$ has a solution between $x = 2.2$ and $x = 2.3$

_____

_____

_____

_____

(Total 2 marks)

Q5.

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

_____

_____

_____

_____

_____

x_2 = _____

x_3 = _____

(2)

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

_____

_____

_____

_____

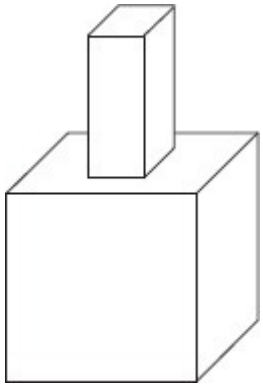
x = _____

(1)

(Total 3 marks)

Q6.

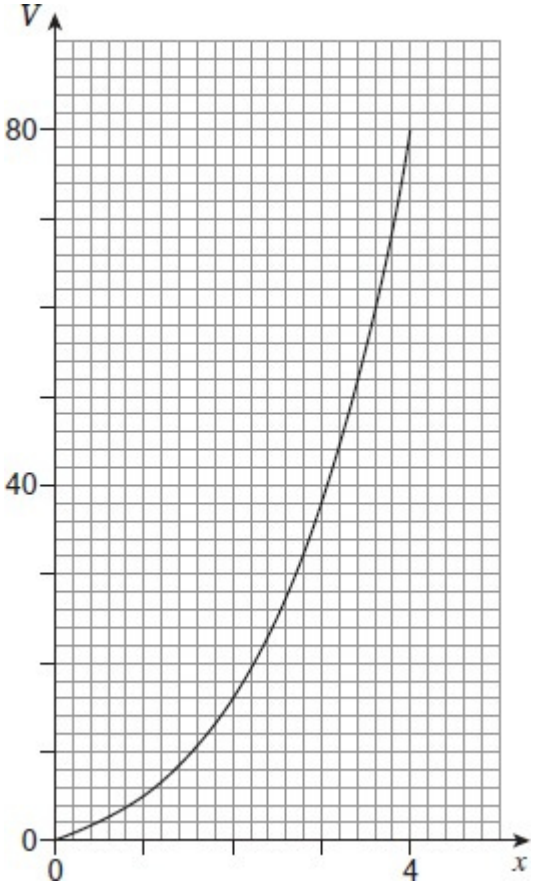
A sculpture consists of a cuboid on top of a cube.



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) $x3 + 4x = 50$

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	*43 + 4 × 4* *= 64 + 16*	*80*	*Too big*

x = _____

(3)
(Total 5 marks)