

The equation $x^3 + 3x = 41$ has a solution between 3 and 4

Use a trial and improvement method to find this solution.
Give your answer correct to one decimal place.

You must show **all** your working.

x	$x^3 + 3x = 41$	Comment
3.5	$3.5^3 + 3 \times 3.5$ $42.875 + 10.5 = 53.375$	Too big
3.3	$3.3^3 + 3 \times 3.3$ $35.937 + 9.9 = 45.837$	Too big
3.1	$3.1^3 + 3 \times 3.1$ $29.791 + 9.3 = 39.091$	Too small
3.2	$3.2^3 + 3 \times 3.2$ $32.768 + 9.6 = 42.368$	Close but too big

I have to choose between these two

3.15

$$3.15^3 + 3 \times 3.15$$

$$31.255875 + 9.45 = 40.705875$$

smaller than
I need ... which tells
me I go for the larger
of my choices

Answer $x = 3.2$ (4 marks)

Use trial and improvement to find a solution to the equation

$$x^3 + 6x = 29$$

Continue the table of results.

Give your solution to 1 decimal place.

x	$x^3 + 6x = 29$	Comment
2	20	Too small
3	$3^3 + 6 \times 3 = 45$	too big
2.5	$2.5^3 + 6 \times 2.5 = 30.625$	too big
2.3	$2.3^3 + 6 \times 2.3 = 25.967$	too small
2.4	$2.4^3 + 6 \times 2.4 = 28.224$	close but small
2.45	$2.45^3 + 6 \times 2.45 = 29.406125$	↑ so we choose smaller choices

so I've got to choose between 2.4 and 2.5

$$x = 2.4$$

Use trial and improvement to solve this problem.

$$x^3 - 2x = 7$$

Give your answer to 1 decimal place.

Show all your trials and their outcomes.

x	$x^3 - 2x = 7$	Comment
2	$2^3 - 2 \times 2 = 8 - 4 = 4$	too small
3	$3^3 - 2 \times 3 = 27 - 6 = 21$	too big
2.5	$2.5^3 - 2 \times 2.5 = 15.625 - 5 = 10.625$	too big
2.3	$2.3^3 - 2 \times 2.3 = 12.167 - 4.6 = 7.567$	too big
2.2	$2.2^3 - 2 \times 2.2 = 10.648 - 4.4 = 6.248$	too small
2.25	$2.25^3 - 2 \times 2.25 = 11.390625 - 4.5 = 6.890625$	close but ↓ so choose larger
<u><u>$x = 2.3$</u></u>		

The equation $2x^2 + x = 7$ has a solution between $x = 1$ and $x = 2$.

Use trial and improvement to find this solution correct to 1 decimal place.

x	$2x^2 + x = 7$	Comment
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1.5	$2 \times 1.5^2 + 1.5 = 6$	too small
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1.8	$2 \times 1.8^2 + 1.8 = 8.28$	too big
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1.7	$2 \times 1.7^2 + 1.7 = 7.48$	too big
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1.6	$2 \times 1.6^2 + 1.6 = 6.72$	too small
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1.65	$2 \times 1.65^2 + 1.65 = 7.095$	↑ so choose smaller
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$x = 1.6$

- (a) Show that the equation $x^3 + 3x - 7 = 0$ has a solution between $x = 1$ and $x = 2$.

when $x = 1$ $1^3 + 3 \times 1 - 7 = -3$

$x = 2$ $2^3 + 3 \times 2 - 7 = 5$

so solution to $x^3 + 3x - 7 = 0$ must lie between 1 and 2
as zero is between -3 and 5

- (b) Using trial and improvement, find this solution correct to 1 decimal place. Show all your trials and their outcomes.

x	$x^3 + 3x - 7 = 0$	Comment
1.5	$1.5^3 + 3 \times 1.5 - 7 = 0.875$	too big
1.4	$1.4^3 + 3 \times 1.4 - 7 = -0.056$	too small
1.45	$1.45^3 + 3 \times 1.45 - 7 = 0.398625$	close but too big

$x = 1.4$

The equation $x^3 - 6x = 72$ has a solution between 4 and 5

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **all** your working.

x	$x^3 - 6x = 72$	Comment
4.5	$4.5^3 - 6 \times 4.5 = 64.125$	toosmall
4.7	$4.7^3 - 6 \times 4.7 = 75.623$	toobig
4.6	$4.6^3 - 6 \times 4.6 = 69.736$	toosmall
4.65	$4.65^3 - 6 \times 4.65 = 72.644625$	close but ↑
$x = 4.6$		