

WJEC GCSE MATHS • GRADE 5

MATHS



EXAM QUESTION PACK

TRIAL AND IMPROVEMENT CUBIC

SCORE

/145

PERCENTAGE

%

STEMUP

- 1 Work out the value of $x^3 + 7x$ when $x = 2.9$.

/ 1

- 2 Show that the equation $x^3 + x^2 = 90$ has a solution between $x = 4$ and $x = 5$.

/ 1

- 3 The equation $x^3 + 3x^2 + 2x = 46$ has a solution between two consecutive whole numbers. Find the two whole numbers. You must show your working.

/ 1

- 4 Work out the value of $x^3 + x - 101$ when $x = 5.48$.

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- 5 Show that the equation $x^3 + 3x = 94$ has a solution between $x = 4$ and $x = 5$.

/ 1

- 6 The equation $x^3 - x = 107$ has a solution between two consecutive whole numbers. Find the two whole numbers. You must show your working.

/ 1

- 7 (a) Work out the value of $x^3 + 2x^2$ when $x = 5.1$.
(b) Is the solution of $x^3 + 2x^2 = 114$ bigger or smaller than 5.1?

/ 1

- 8 Show that the equation $x^3 + 6x^2 = 65$ has a solution between $x = 2$ and $x = 3$.

/ 1

- 9 The equation $x^3 + 6x - 66 = 0$ has a solution between two consecutive whole numbers. Find the two whole numbers. You must show your working.

/ 1

- 10** (a) Work out the value of $x^3 + 2x^2$ when $x = 5.3$.
(b) Is the solution of $x^3 + 2x^2 = 74$ bigger or smaller than 5.3?

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- 11** Sion is solving the equation $x^3 + 8x = 47$ using trial and improvement.
Sion finds that the solution is between $x = 2.8$ and $x = 2.9$.
Use a trial at $x = 2.85$ to find the solution correct to 1 decimal place.

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- 12** The equation $x^3 + x^2 + 5x = 25$ has a solution between two consecutive whole numbers.
Find the two whole numbers. You must show your working.

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- 13** Here is part of a table for the equation $x^3 - x = 68$. The solution is the value of x where the second column equals 68.

(a) Complete the table.

(b) Write down the solution of the equation correct to 1 decimal place.

x	$x^3 - x$	Too big or too small?
4.1		
4.15	67.323	
4.2		

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- 14** Carys is solving the equation $x^3 + 2x^2 = 11$ using trial and improvement.

Carys finds that the solution is between $x = 1.7$ and $x = 1.8$.

Use a trial at $x = 1.75$ to find the solution correct to 1 decimal place.

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- 15** Use trial and improvement to solve $x^3 = 269$.

Give your answer correct to 1 decimal place.

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- 16** Here is part of a table for the equation $x^3 - 2x - 80 = 0$. The solution is the value of x where the second column equals 0.

(a) Complete the table.

(b) Write down the solution of the equation correct to 1 decimal place.

x	$x^3 - 2x - 80$	Too big or too small?
4.4	-3.616	
4.45		
4.5		

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- 17** Iwan is solving the equation $x^3 + 6x^2 = 64$ using trial and improvement.

Iwan finds that the solution is between $x = 2.7$ and $x = 2.8$.

Use a trial at $x = 2.75$ to find the solution correct to 1 decimal place.

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- 18** Iwan is using trial and improvement to solve $x^3 + 5x^2 = 43$. The trials so far are shown in the table.

(a) Write down the two values of x from the table that are closest together and either side of the solution.

(b) Work out the next value of x she should try, and use it to give the solution correct to 1 decimal place.

x	2	3	2.5	2.2	2.3	2.4
$x^3 + 5x^2$	28	72	46.875	34.848	38.617	42.624

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- 19** Here is part of a table for the equation $x^3 + 2x - 89 = 0$. The solution is the value of x where the second column equals 0.

(a) Complete the table.

(b) Write down the solution of the equation correct to 1 decimal place.

x	$x^3 + 2x - 89$	Too big or too small?
4.3		
4.35		
4.4	4.984	

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- 20** Sion is solving the equation $x^3 - 2x = 62$ using trial and improvement.

Sion finds that the solution is between $x = 4.1$ and $x = 4.2$.

Use a trial at $x = 4.15$ to find the solution correct to 1 decimal place.

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- 21** Use trial and improvement to solve $x^3 = 324$.

Give your answer correct to 1 decimal place.

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- 22 Megan is using trial and improvement to solve $x^3 - x - 92 = 0$. The trials so far are shown in the table.

(a) Write down the two values of x from the table that are closest together and either side of the solution.

(b) Work out the next value of x she should try, and use it to give the solution correct to 1 decimal place.

x	4	5	4.5	4.7	4.6
$x^3 - x - 92$	-32	28	-5.375	7.123	0.736

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- 23 Elin is solving the equation $x^3 - x^2 - 2x = 116$ using trial and improvement.

Elin finds that the solution is between $x = 5.3$ and $x = 5.4$.

Use a trial at $x = 5.35$ to find the solution correct to 1 decimal place.

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- 24 The equation $x^3 - x^2 + 2x = 85$ has a solution between $x = 4$ and $x = 5$.

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

You must show all your trials.

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- 25 Mari is using trial and improvement to solve $x^3 + x - 85 = 0$. The trials so far are shown in the table.

(a) Write down the two values of x from the table that are closest together and either side of the solution.

(b) Work out the next value of x she should try, and use it to give the solution correct to 1 decimal place.

x	4	5	4.5	4.2	4.3	4.4
$x^3 + x - 85$	-17	45	10.625	-6.712	-1.193	4.584

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- 26 Owen is solving $x^3 - 2x - 59 = 0$.

Owen works out that when $x = 4.0$ the value is -3 (too small) and when $x = 4.1$ the value is 1.721 (too big).

Owen says, "So the solution is 4.0 correct to 1 decimal place."

Explain why Owen may be wrong, then find the solution correct to 1 decimal place.

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- 27 The equation $x^3 - 2x = 109$ has a solution between $x = 4$ and $x = 5$.

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

You must show all your trials.

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- 28 The equation $x^3 + 3x = -62$ has a solution between $x = -4$ and $x = -3$.
Use trial and improvement to find this solution correct to 1 decimal place.

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- 29 Emyr is solving $x^3 + x - 86 = 0$.
Emyr works out that when $x = 4.3$ the value is -2.193 (too small) and when $x = 4.4$ the value is 3.584 (too big).
Emyr says, "So the solution is 4.4 correct to 1 decimal place."
Explain why Emyr may be wrong, then find the solution correct to 1 decimal place.

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- 30 The equation $x^3 - 2x = 53$ has a solution between $x = 3$ and $x = 4$.
Use trial and improvement to find this solution correct to 1 decimal place.
You must show all your trials.

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- 31 The equation $x^3 + 5x = -10$ has a solution between $x = -2$ and $x = -1$.
Use trial and improvement to find this solution correct to 1 decimal place.

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- 32 Bethan is solving $x^3 - 2x = 74$.
Bethan works out that when $x = 4.3$ the value is 70.907 (too small) and when $x = 4.4$ the value is 76.384 (too big).
Bethan says, "So the solution is 4.3 correct to 1 decimal place."
Explain why Bethan may be wrong, then find the solution correct to 1 decimal place.

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- 33 The equation $x^3 - x^2 - x = 92$ has a solution between $x = 4$ and $x = 5$.
Use trial and improvement to find this solution correct to 1 decimal place.
You must show all your trials.

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- 34 (a) Show that the equation $x^3 - 5x - 70 = 0$ has a solution between $x = 4$ and $x = 5$.
(b) Use trial and improvement to find this solution correct to 1 decimal place.

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- 35 Gareth is solving $x^3 + 5x^2 = 87$.
Gareth works out that when $x = 3.2$ the value is 83.968 (too small) and when $x = 3.3$ the value is 90.387 (too big).
Gareth says, "So the solution is 3.3 correct to 1 decimal place."
Explain why Gareth may be wrong, then find the solution correct to 1 decimal place.

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- 36 The equation $x^3 + x^2 = 53$ has a solution between $x = 3$ and $x = 4$.
Use trial and improvement to find this solution correct to 1 decimal place.
You must show all your trials.

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- 37 (a) Show that the equation $x^3 + x - 15 = 0$ has a solution between $x = 2$ and $x = 3$.
(b) Use trial and improvement to find this solution correct to 1 decimal place.

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- 38 A box is a cuboid with a square base of side x cm and height $(x + 4)$ cm.
The volume of the box is 290 cm^3 .
Use trial and improvement to find the value of x correct to 1 decimal place.

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- 39 The equation $x^3 + 3x = 60$ has a solution between $x = 3.6$ and $x = 3.7$.
Use trial and improvement to find this solution correct to 2 decimal places.
You must show all your trials, including the half-way value test.

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- 40 (a) Show that the equation $x^3 - 3x - 31 = 0$ has a solution between $x = 3$ and $x = 4$.
(b) Use trial and improvement to find this solution correct to 1 decimal place.

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- 41 The volume of a solid is given by $x(x^2 + 2) \text{ cm}^3$, where x is a length in cm.
The volume is 364 cm^3 .
Use trial and improvement to find x correct to 1 decimal place.

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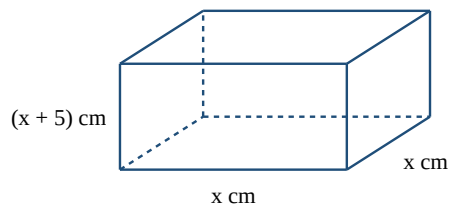
- 42 The equation $x^3 + 4x = 100$ has a solution between $x = 4.3$ and $x = 4.4$.
Use trial and improvement to find this solution correct to 2 decimal places.
You must show all your trials, including the half-way value test.

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- 43 (a) Show that the equation $x^3 - 4x - 95 = 0$ has a solution between $x = 4$ and $x = 5$.
 (b) Use trial and improvement to find this solution correct to 1 decimal place.

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- 44 The diagram shows a cuboid. Its volume is 120 cm^3 .
 (a) Show that $x^3 + 5x^2 = 120$.
 (b) The equation has a solution between 3 and 4. Use trial and improvement to find it correct to 1 decimal place. Diagram NOT accurately drawn



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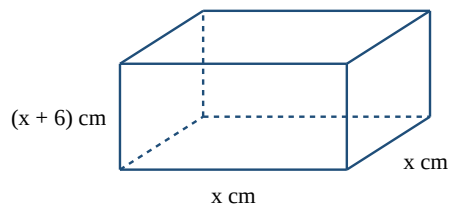
- 45 The equation $x^3 + x - 56 = 0$ has a solution between $x = 3.7$ and $x = 3.8$.
 Use trial and improvement to find this solution correct to 2 decimal places.
 You must show all your trials, including the half-way value test.

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- 46 The equation $x^3 + 8x = 10$ has a solution between $x = 1.0$ and $x = 1.1$.
Use trial and improvement to find this solution correct to 2 decimal places.
You must show all your trials, including the half-way value test.

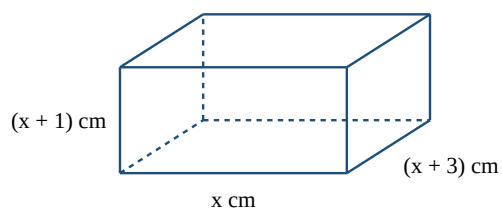
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- 47 The diagram shows a cuboid. Its volume is 180 cm^3 .
(a) Show that $x^3 + 6x^2 = 180$.
(b) The equation has a solution between 4 and 5. Use trial and improvement to find it correct to 1 decimal place. Diagram NOT accurately drawn



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- 48 The diagram shows a cuboid. Its volume is 116 cm^3 .
(a) Show that $x^3 + 4x^2 + 3x = 116$.
(b) The equation has a solution between 3 and 4. Use trial and improvement to find it correct to 1 decimal place. Diagram NOT accurately drawn

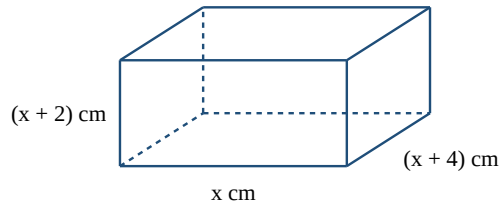


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49 The diagram shows a cuboid. Its volume is 53 cm^3 .

(a) Show that $x^3 + 6x^2 + 8x = 53$.

(b) The equation has a solution between 2 and 3. Use trial and improvement to find it correct to 1 decimal place. Diagram NOT accurately drawn

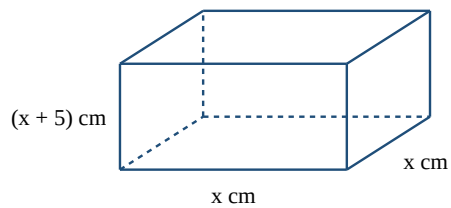


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50 The diagram shows a cuboid. Its volume is 129 cm^3 .

(a) Show that $x^3 + 5x^2 = 129$.

(b) The equation has a solution between 3 and 4. Use trial and improvement to find it correct to 1 decimal place. Diagram NOT accurately drawn



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