

Name:

Exam Style Questions

Trial and Improvement



Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 116



Answers and Video Solutions



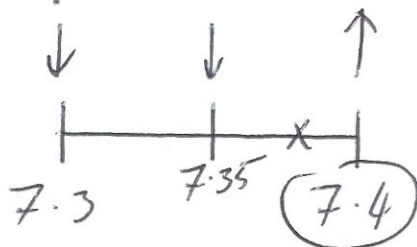
1. The equation $x^2 + x = 62$



has a solution between 7 and 8.

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

x	$x^2 + x$	Comment
7	$7^2 + 7 = 56$	too low
8	$8^2 + 8 = 72$	too high
7.3	$7.3^2 + 7.3 = 60.59$	too low
7.4	$7.4^2 + 7.4 = 62.16$	too high
7.35	$7.35^2 + 7.35 = 61.372$	too low



$x = \dots 7.4 \dots$

(4)

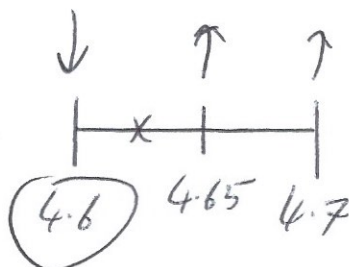
2. The equation $x^2 - 2x = 12$



has a solution between 4 and 5.

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

x	$x^2 - 2x$	Comment
4	$4^2 - 2 \times 4 = 8$	too low
5	$5^2 - 2 \times 5 = 15$	too high
4.5	$4.5^2 - 2 \times 4.5 = 11.25$	too low
4.6	$4.6^2 - 2 \times 4.6 = 11.96$	too low
4.7	$4.7^2 - 2 \times 4.7 = 12.69$	too high
4.65	$4.65^2 - 2 \times 4.65 = 12.3225$	too high



$x = 4.6$ (4)

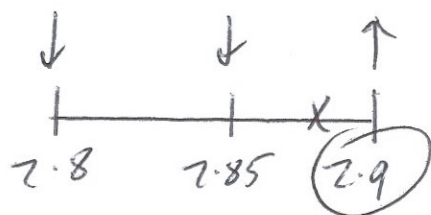
3. The equation $x^3 + 3x = 32$



has a solution between 2 and 3.

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

x	$x^3 + 3x$	Comment
2	$2^3 + 3 \times 2 = 14$	too low
3	$3^3 + 3 \times 3 = 36$	too high
2.8	$2.8^3 + 3 \times 2.8 = 30.352$	too low.
2.9	$2.9^3 + 3 \times 2.9 = 33.089$	too high
2.85	$2.85^3 + 3 \times 2.85 = 31.699...$	too low



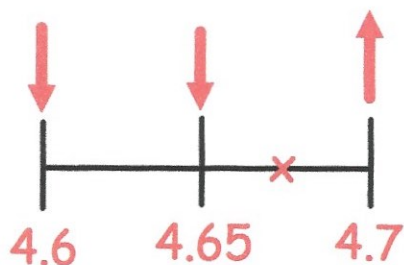
$x = \dots 2.9 \dots$
(4)

4. Ciara is solving the equation $x^2 - 5x = 80$ to one decimal place, using trial and improvement.



Below is her method.

x	$x^2 - 5x$	Comment
5	$5^3 - 5 \times 5 = 100$	Too big
4	$4^3 - 5 \times 4 = 44$	Too small
4.5	$4.5^3 - 5 \times 4.5 = 68.625$	Too small
4.6	$4.6^3 - 5 \times 4.6 = 74.336$	Too small
4.7	$4.7^3 - 5 \times 4.7 = 80.323$	Too big
4.65	$4.65^3 - 5 \times 4.65 = 77.294\dots$	Too small



Answer: 4.7

Explain her mistake.

Ciara has cubed x rather than squared.

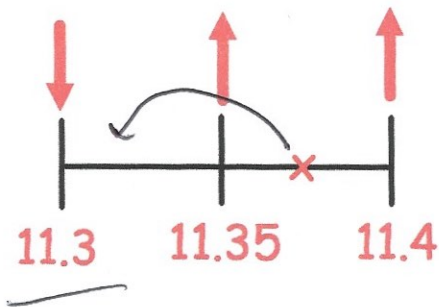
(2)

5. William is solving the equation $x^3 - 9x^2 = 300$ using trial and improvement.



Below is his method.

x	$x^3 - 9x^2$	Comment
11	242	Too low
12	432	Too high
11.4	311.904	Too high
11.3	293.687	Too low
11.35	302.732875	Too high



Answer: 11.4

Explain his mistake.

The solution would be ~~between~~ between 11.3 and 11.35,
not 11.35 and 11.4.

The answer would be 11.3

(2)

6. The equation



$$x^3 + 2x = 50$$

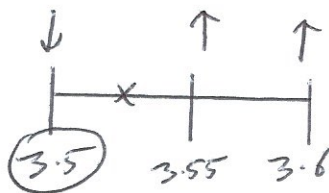
has a solution between 3 and 4.

Use trial and improvement to find this solution.

Give your answer correct to 1 decimal place.

You must show all your working.

x	$x^3 + 2x$	Comment
3	$3^3 + 2 \times 3 = 33$	too low
4	$4^3 + 2 \times 4 = 72$	too high
3.5	$3.5^3 + 2 \times 3.5$ $= 49.875$	too low
3.6	$3.6^3 + 2 \times 3.6$ $= 53.856$	too high
3.55	$3.55^3 + 2 \times 3.55$ $= 51.8389\dots$	too high



$$x = \frac{3.5}{\dots\dots\dots}$$

(4)

7. The equation



$$x^3 + 4x = \del{168} 168$$

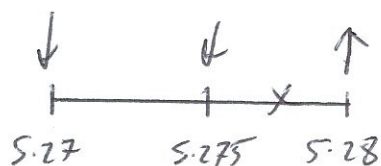
has a solution between 5 and 6.

Use trial and improvement to find this solution.

Give your answer correct to 2 decimal places.

You must show all your working.

x	$x^3 + 4x$	Comment
5	$5^3 + 4 \times 5 = 145$	too low
6	$6^3 + 4 \times 6 = 240$	too high
5.3	$5.3^3 + 4 \times 5.3 = 170.077$	too high
5.2	$5.2^3 + 4 \times 5.2 = 161.408$	too low
5.28	$5.28^3 + 4 \times 5.28 = 168.317952$	too high
5.275 5.27	$5.27^3 + 4 \times 5.27 = 167.443183$	too low
5.275	$5.275^3 + 4 \times 5.275 = 167.880$	too low



$$x = \underline{\underline{5.28}}$$

(5)

8. The equation



$$(x + 1)(x + 3) = 84$$

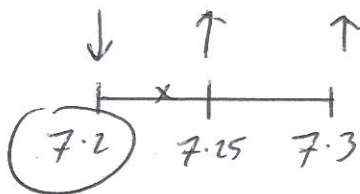
has a solution between 7 and 8.

Use trial and improvement to find this solution.

Give your answer correct to 1 decimal place.

You must show all your working.

x	$(x+1)(x+3)$	Comment
7	$(7+1)(7+3) = 80$	too low
8	$(8+1)(8+3) = 99$	too high
7.2	$(7.2+1)(7.2+3) = 83.64$	too low
7.3	$(7.3+1)(7.3+3) = 85.49$	too high
7.25	$(7.25+1)(7.25+3) = 84.5625$	too high



$$x = \overset{7.2}{\dots\dots\dots} \quad (4)$$

9. The equation



$$2x^2 + 3x = 50$$

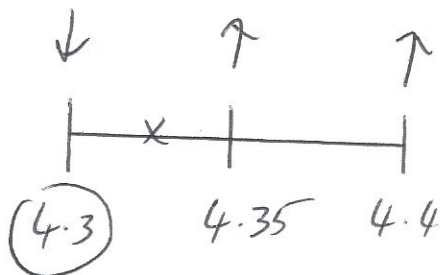
has a solution between 4 and 5.

Use trial and improvement to find this solution.

Give your answer correct to 1 decimal place.

You must show all your working.

x	$2x^2 + 3x$	Comment
4	$2 \times 4^2 + 3 \times 4 = 44$	too low
5	$2 \times 5^2 + 3 \times 5 = 65$	too high
4.5	$2 \times 4.5^2 + 3 \times 4.5 = 54$	too high
4.4	$2 \times 4.4^2 + 3 \times 4.4 = 51.92$	too high
4.3	$2 \times 4.3^2 + 3 \times 4.3 = 49.88$	too low
4.35	$2 \times 4.35^2 + 3 \times 4.35 = 50.895$	too high



$$x = \underline{\quad 4.3 \quad}$$

(4)

10. The equation



$$x^3 + 2x^2 = 40$$

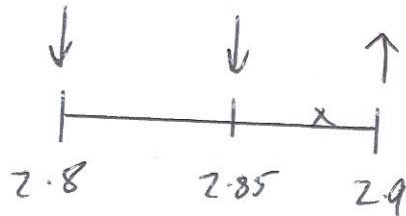
has a solution between 2 and 3.

Use trial and improvement to find this solution.

Give your answer correct to 1 decimal place.

You must show all your working.

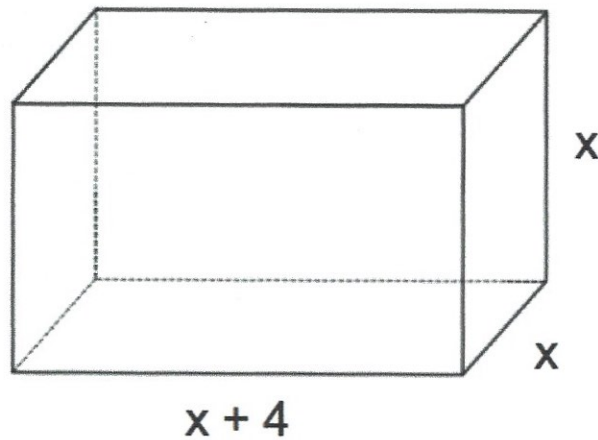
x	$x^3 + 2x^2$	Comment
2	$2^3 + 2 \times 2^2 = 16$	too low
3	$3^3 + 2 \times 3^2 = 45$	too high
2.8	$2.8^3 + 2 \times 2.8^2 = 37.632$	too low
2.9	$2.9^3 + 2 \times 2.9^2 = 41.209$	too high
2.85	$2.85^3 + 2 \times 2.85^2 = 39.394125$	too low



$$x = \overset{2.9}{\dots\dots\dots}$$

(4)

11. Shown below is a cuboid.

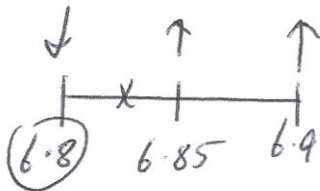


The volume of the cuboid is 500cm^3 .

An expression for the volume of the cuboid is $x^3 + 4x^2$

Use trial and improvement to find the value of x to 1 decimal place.

x	$x^3 + 4x^2$	Comment
6	$6^3 + 4 \times 6^2 = 360$	too low
7	$7^3 + 4 \times 7^2 = 539$	too high
6.8	$6.8^3 + 4 \times 6.8^2 = 499.392$	too low
6.9	$6.9^3 + 4 \times 6.9^2 = 518.949$	too high
6.85	$6.85^3 + 4 \times 6.85^2 = 509.10\dots$	too high

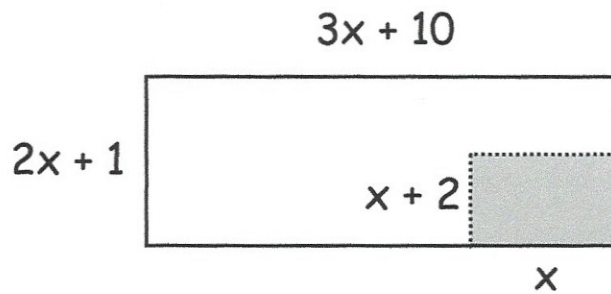


$x = \dots\dots\dots 6.8 \dots\dots\dots$
 (4)

12.



Nina had a rectangular piece of white card measuring $(3x + 10)$ cm by $(2x + 1)$ cm. She removed a smaller rectangle from the corner, measuring $(x + 2)$ cm by x cm.



The area of card remaining is 130cm^2

(a) Show that $5x^2 + 21x = 120$

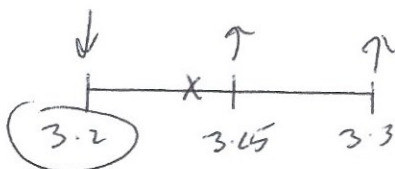
$$\begin{aligned} (3x + 10)(2x + 1) - x(x + 2) &= 130 \\ 6x^2 + 3x + 20x + 10 - [x^2 + 2x] &= 130 \\ 6x^2 + 23x + 10 - x^2 - 2x &= 130 \\ 5x^2 + 21x &= 120 \end{aligned}$$

(2)

(b) $5x^2 + 21x = 120$ has a solution between $x = 3$ and $x = 4$.

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

x	$5x^2 + 21x$	Comment
3	$5 \times 3^2 + 21 \times 3 = 108$	too low
4	$5 \times 4^2 + 21 \times 4 = 164$	too high
3.2	$5 \times 3.2^2 + 21 \times 3.2 = 118.4$	too low
3.3	$5 \times 3.3^2 + 21 \times 3.3 = 123.75$	too high
3.25	$5 \times 3.25^2 + 21 \times 3.25 = 121.06$	too high



$$x = 3.2$$

(4)