Iteration

1 4 d.p. in each box

Use $x_{n+1} = \sqrt[3]{x_n + 15}$ with $x_0 = 3$.
Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt[3]{x_n + 15}$$

x_0	x_1	x_2		x_3	x_4	x_5
3	2.6207		→			

Solution _____

2

Use $x_{n+1} = \sqrt[3]{11 - x_n}$ with $x_0 = 2$.
Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt[3]{11 - x_n}$$

x_0	x_1	x_2		x_3	x_4	x_5
2	2.0801		→			

Solution _____

3

Use $x_{n+1} = \sqrt[3]{2x_n + 12}$ with $x_0 = 3$.
Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt[3]{2x_n + 12}$$

x_0	x_1	x_2		x_3	x_4	x_5
3			→			

Solution _____

4

Use $x_{n+1} = \sqrt[3]{4x_n + 11}$ with $x_0 = 3$.
Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt[3]{4x_n + 11}$$

_____

_____

Solution _____

5

Show that $x^3 + 3x - 9 = 0$ has a solution between $x = 1$ and $x = 2$.

x	$x^3 + 3x - 9$	positive or negative?
1		
2		

_____

So _____

6

Show that $x^3 - 6x - 1 = 0$ can be written as $x = \sqrt[3]{6x + 1}$.

Write every step.

_____

_____

$x =$ _____

7

Use $x_{n+1} = \frac{6 - x_n^3}{7}$ with $x_0 = 1$ to find x_1, x_2 and x_3. Round each to 3 decimal places.

$$x_{n+1} = \frac{6 - x_n^3}{7}$$

x_0	x_1	x_2		x_3
1			→	

$x_3 =$ _____

8

Leo uses $x_{n+1} = \sqrt[3]{20 - x_n}$ with $x_0 = 3$.
Each time he types $\sqrt[3]{20 - 3}$, so he gets 2.5713 again and again, and says the solution is 2.57. Explain his mistake.
Then find the solution to 2 decimal places.

_____

_____

Solution _____

Iteration *further practice*

9

Use $x_{n+1} = \sqrt[3]{9 - x_n}$ with $x_0 = 2$ to find a solution to 2 decimal places.
Keep going until two values in a row agree.

Answer _____

10

Show that $x^3 = 4x + 2$ has a solution between $x = 2$ and $x = 3$.

Answer _____

11

Show that $x^3 + 6x - 5 = 0$ can be written as $x = \frac{5 - x^3}{6}$. Then use $x_{n+1} = \frac{5 - x_n^3}{6}$ with $x_0 = 1$ to find x_1, x_2 and x_3 to 3 decimal places.

Answer _____

12

Priya thinks of a number. She cubes it, then adds her number. She gets 40.
Write an equation, then use $x_{n+1} = \sqrt[3]{40 - x_n}$ with $x_0 = 3$ to find her number to 2 decimal places.

Answer _____

13

The formula $x_{n+1} = \sqrt[3]{k + x_n}$, with $x_0 = 3$, gives $x_1 = 2$. Find k. Then find x_2 to 4 decimal places.

Answer _____

14

Amir uses $x_{n+1} = \sqrt[3]{x_n + 11}$ with $x_0 = 1$.
Chloe uses the same formula with $x_0 = 4$. Do they get the same solution to 2 decimal places?

Answer _____

15

Show that $x^3 + 4x - 2 = 0$ can be written as $x = \frac{2}{x^2 + 4}$. Then use $x_{n+1} = \frac{2}{x_n^2 + 4}$ with $x_0 = 0.5$ to find x_3 to 3 decimal places.

Answer _____

16

Ben uses $x_{n+1} = \sqrt[3]{x_n + 17}$ with $x_0 = 3$.
He gets $x_1 = 2.7144$ and $x_2 = 2.7014$.
Both are 2.7 to 1 decimal place, so he stops and gives the solution as 2.7 to 2 decimal places. Explain his mistakes, then give the solution.

Answer _____