Iteration

1

Start with $x_0 = 6$. Find x_1, x_2 and x_3.

$$x_{n+1} = \frac{x_n + 14}{2}$$

x_0	x_1	x_2	x_3
6 →	10 →		

$x_1 = \frac{6+14}{2} = 10$

$x_2 =$

$x_3 =$

2

Start with $x_0 = 3$. Find x_1, x_2 and x_3.

$$x_{n+1} = 3x_n - 4$$

x_0	x_1	x_2	x_3
3 →	5 →		

$x_1 =$

$x_2 =$

$x_3 =$

3

Start with $x_0 = 1$. Find x_1, x_2 and x_3.

$$x_{n+1} = \frac{x_n + 17}{2}$$

x_0	x_1	x_2	x_3
1 →			

$x_1 =$

$x_2 =$

$x_3 =$

4 *Notice the change!*

Start with $x_0 = 3$. Find x_1, x_2 and x_3 to 3 decimal places.

$$x_{n+1} = \sqrt{x_n + 5}$$

x_0	x_1	x_2	x_3
3 →	2.828 →		

$x_1 =$

$x_2 =$

$x_3 =$

5

Start with $x_0 = 1$. Find x_1, x_2 and x_3 to 3 decimal places.

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

x_0	x_1	x_2	x_3
1 →			

$x_1 =$

$x_2 =$

$x_3 =$

6

Ali uses this formula with $x_0 = 10$.

He writes $x_1 = \sqrt{10} + 6 = 9.162$.

Explain his mistake. Then find x_1 and x_2.

$$x_{n+1} = \sqrt{x_n + 6}$$

$x_1 =$

$x_2 =$

7 *Notice the change!*

Start with $x_0 = 2$. Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt{x_n + 7}$$

	4 d.p.	2 d.p.
x_1	3	3.00
x_2		
x_3		
x_4		
x_5		
x_6		

Solution _____ **(2 d.p.)**

8

Start with $x_0 = 3$. Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt{2x_n + 5}$$

	4 d.p.	2 d.p.
x_1		
x_2		
x_3		
x_4		
x_5		
x_6		

Solution _____ **(2 d.p.)**

Iteration *further practice*

9

Start with $x_0 = 0$. Find x_3.

$$x_{n+1} = \frac{x_n + 24}{2}$$

Answer _____

10

Start with $x_0 = 1$. Find x_1, x_2 and x_3 to 3 decimal places.

$$x_{n+1} = \sqrt{x_n + 20}$$

Answer _____

11

Jo saves. A_n is the amount in her account, in £, at the start of year n, and $A_0 = 1000$. How much is in the account at the start of year 3?

$$A_{n+1} = 1.05A_n + 100$$

Answer _____

12

Start with $x_0 = 3$. Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = \sqrt{x_n + 13}$$

Answer _____

13

$x_1 = 4$. Find x_0.

$$x_{n+1} = \frac{x_n + 10}{4}$$

Answer _____

14

A cup of tea cools. T_n is its temperature in °C after n minutes, and $T_0 = 80$.

After how many minutes is it first below 60 °C?

$$T_{n+1} = 0.9T_n + 2$$

Answer _____

15

Start with $x_0 = 3$. Keep going until two values in a row agree to 2 decimal places.

$$x_{n+1} = 3 + \frac{2}{x_n}$$

Answer _____

16

Mia starts with $x_0 = 5$. She says the values will never change. Is she right? Explain why.

$$x_{n+1} = \frac{x_n + 15}{4}$$

Answer _____