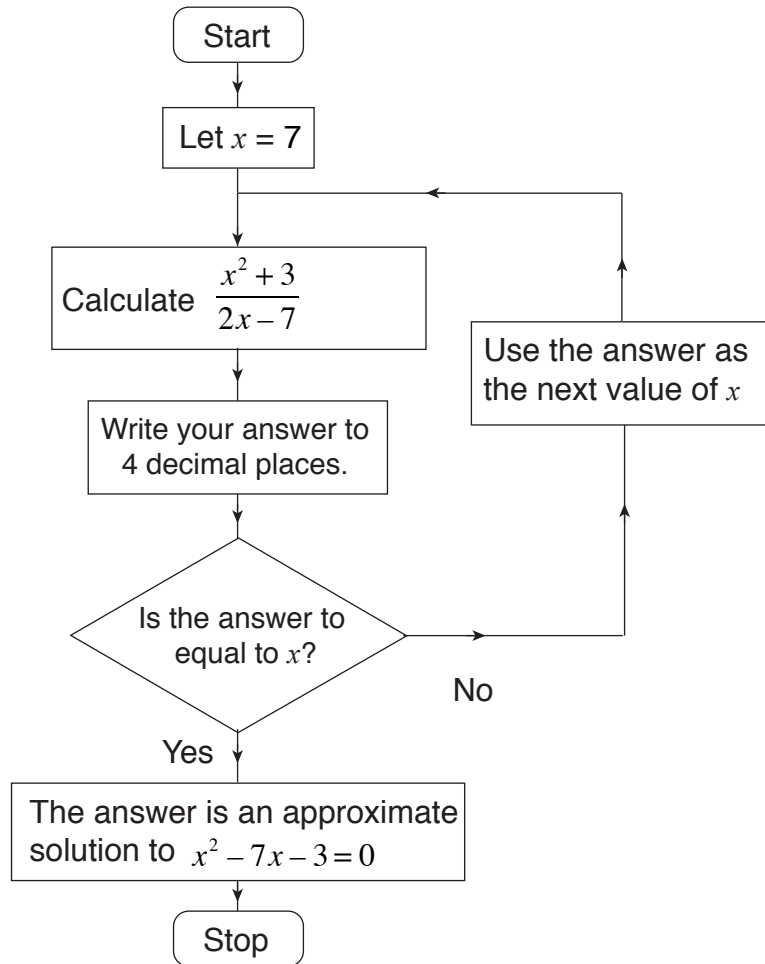


# Iteration to solve equations 1

Sample resources

1 Here is a flow diagram



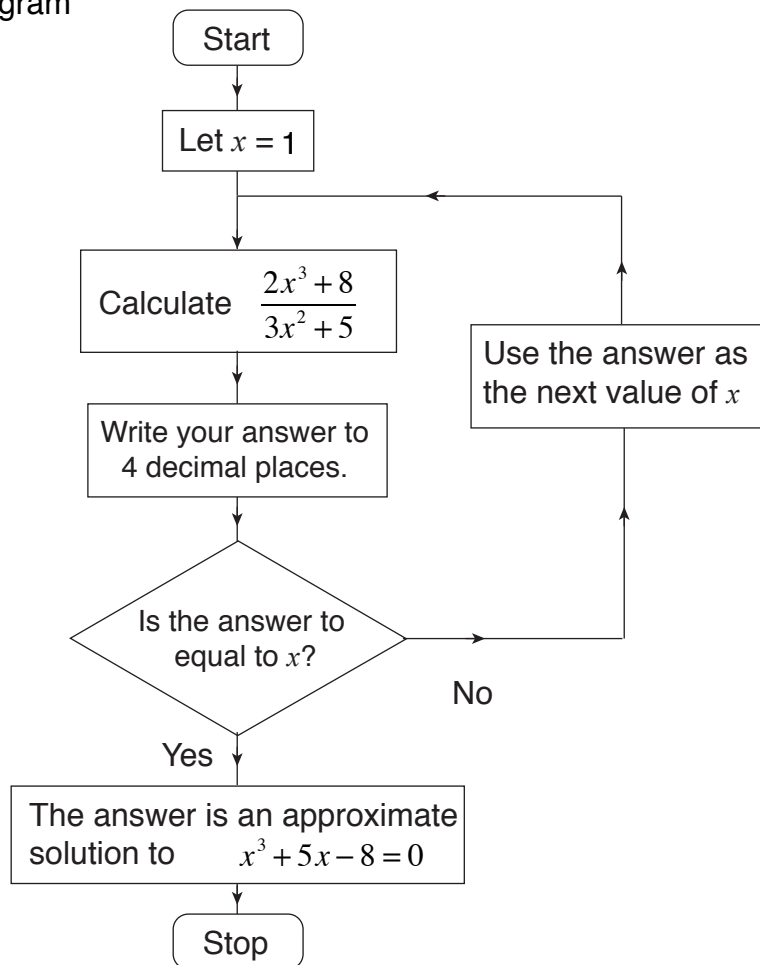
The flow diagram can be used to find an approximate solution to  $x^2 - 7x - 3 = 0$   
 Use the flow diagram to complete this table:

|       | Value of $x$ | $\frac{x^2 + 3}{2x - 7}$ | Are the values equal? |
|-------|--------------|--------------------------|-----------------------|
| $x_1$ | 4            | 7.4286                   | No                    |
| $x_2$ | 7.4286       |                          |                       |
| $x_3$ |              |                          |                       |

# Iteration to solve equations 2

Licensed to:

1 Here is a flow diagram



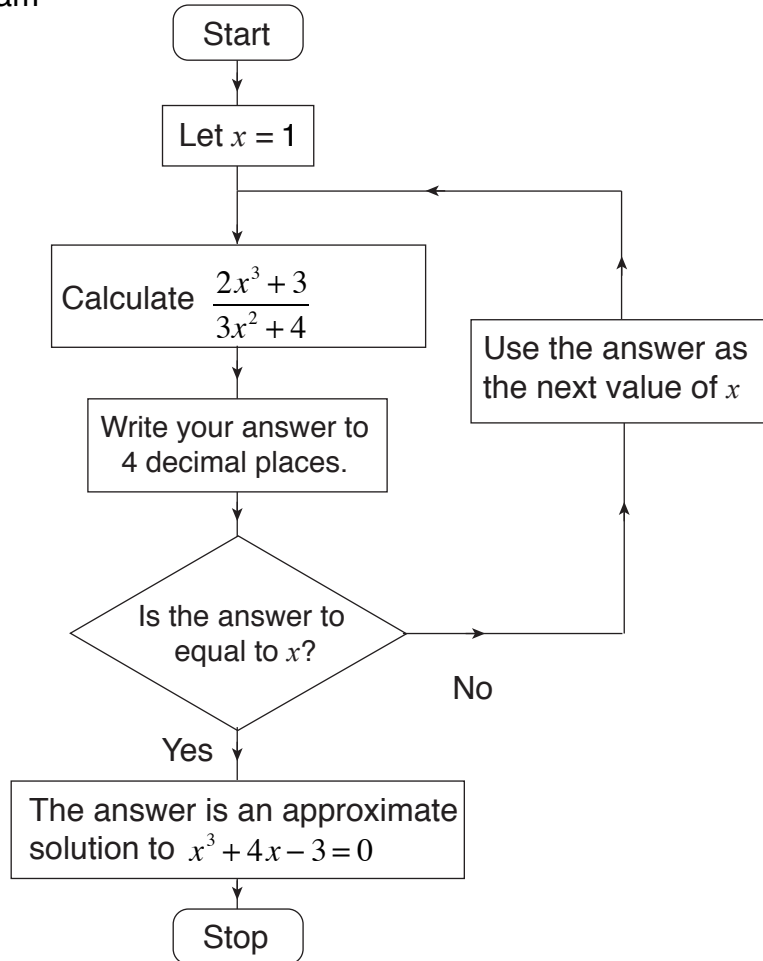
The flow diagram can be used to find an approximate solution to  $x^3 + 5x - 8 = 0$   
 Use the flow diagram to complete this table:

|       | Value of $x$ | $\frac{2x^3 + 8}{3x^2 + 5}$ | Are the values equal? |
|-------|--------------|-----------------------------|-----------------------|
| $x_1$ | 1            |                             | No                    |
| $x_2$ |              |                             |                       |
| $x_3$ |              |                             |                       |
| $x_4$ |              |                             |                       |

# Iteration to solve equations 3

Licensed to:

1 Here is a flow diagram



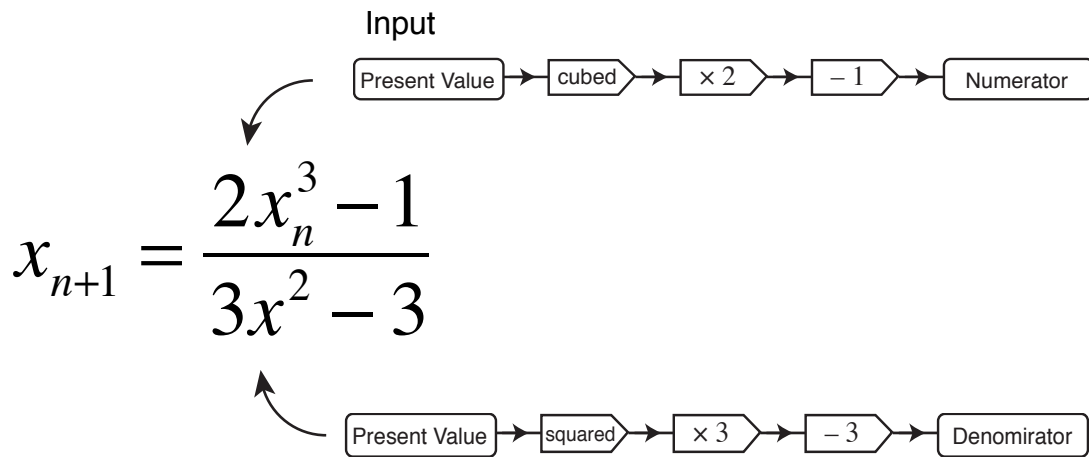
The flow diagram can be used to find an approximate solution to  $x^3 + 4x - 3 = 0$   
Use the flow diagram to complete this table:

|       | Value of $x$ | $\frac{2x^3 + 3}{3x^2 + 4}$ | Are the values equal? |
|-------|--------------|-----------------------------|-----------------------|
| $x_1$ |              |                             | No                    |
| $x_2$ |              |                             |                       |
| $x_3$ |              |                             |                       |
| $x_4$ |              |                             |                       |

# Iteration to solve equations 4

Sample resources

1 Here is an iterative process to find approximate solutions to  $x^3 - 3x + 1 = 0$



$x_n$  means 'the **present** value'.  $x_{n+1}$  means 'the **next** value'.

Use  $x = 4$  to start the process.

Calculate each of your answers to 4 decimal places.

Complete the table:

|       | Present value: $x_n$ | The next value: $x_{n+1}$ | Are the values equal? |
|-------|----------------------|---------------------------|-----------------------|
| $x_1$ | 0.5                  | 0.3333                    | No                    |
| $x_2$ | 0.3333               |                           |                       |
| $x_3$ |                      |                           |                       |
| $x_4$ |                      |                           |                       |

# Iteration to solve equations 5

Sample resources

- 1 Here is an iterative process to find approximate solutions to  $x^2 - 30 = 0$

$$x_{n+1} = \frac{x_n^2 + 30}{2x_n}$$

Use  $x = 5$  to start the process.

Calculate each of your answers to 4 decimal places.

Complete the table.

|       | Present value: $x_n$ | The next value: $x_{n+1}$ | Are the values equal? |
|-------|----------------------|---------------------------|-----------------------|
| $x_1$ |                      |                           |                       |
| $x_2$ |                      |                           |                       |
| $x_3$ |                      |                           |                       |

- 2 Here is an iterative process to find approximate solutions to  $x^3 + 2x - 4 = 0$

$$x_{n+1} = \frac{2x_n^3 + 4}{3x_n^2 + 2}$$

Use  $x = 1$  to start the process.

Calculate each of your answers to 4 decimal places.

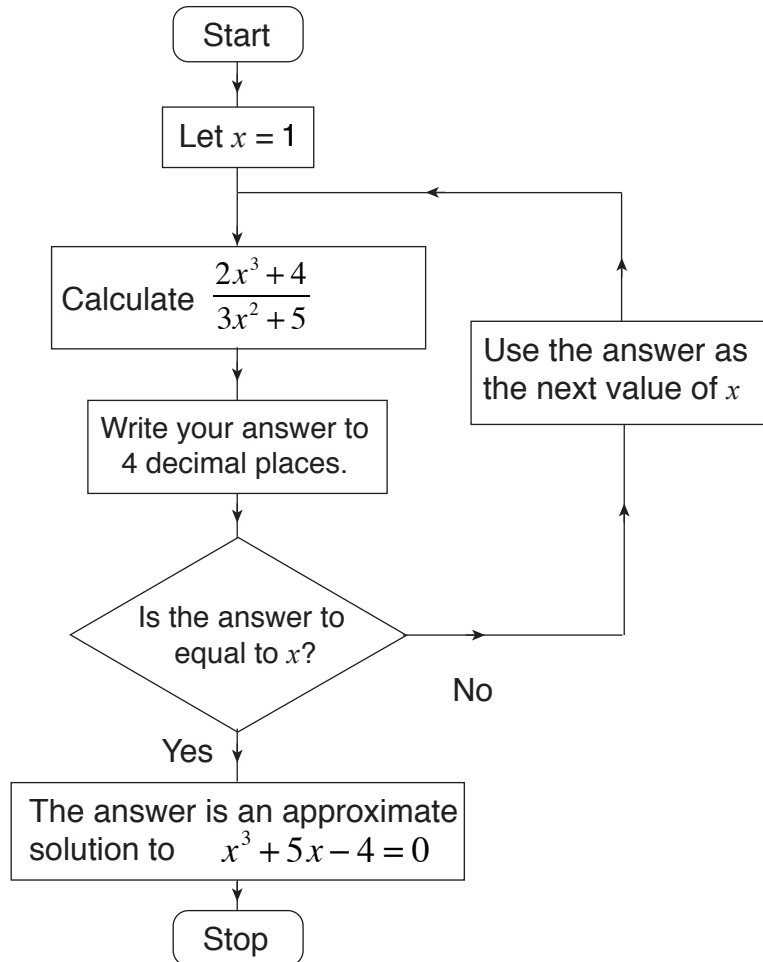
Complete the table.

|       | Present value: $x_n$ | The next value: $x_{n+1}$ | Are the values equal? |
|-------|----------------------|---------------------------|-----------------------|
| $x_1$ |                      |                           |                       |
| $x_2$ |                      |                           |                       |
| $x_3$ |                      |                           |                       |
| $x_4$ |                      |                           |                       |

# Iteration to solve equations: Test (page 1)

Sample resources

- 1 This iterative process can be used to find approximate solutions to  $x^3 + 5x - 4 = 0$



Use this iterative process to find a solution to 4 decimal places of  $x^3 + 5x - 4 = 0$

Start with the value  $x = 1$

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# Iteration to solve equations: Test (page 2)

Sample resources

1 Here is an iterative process

$$x_{n+1} = \frac{x_n^2 + 52}{2x_n}$$

Use this iterative process to calculate an approximate solution to  $x^2 - 52 = 0$   
Calculate each of your answers to 4 decimal places.  
Use  $x = 7$  to start the process.

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2 Here is an iterative process

$$x_{n+1} = \frac{2x_n^3 + 2}{3x_n^2 + 5}$$

Use this iterative process to calculate an approximate solution to  $x^3 + 5x - 2 = 0$   
Calculate each of your answers to 4 decimal places.  
Use  $x = 1$  to start the process.

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# ***Iteration to solve equations: Solutions***

*Sample resources*

## **Iteration to solve equations 1**

**1** 7.4052

## **Iteration to solve equations 2**

**1** 1.2289

## **Iteration to solve equations 3**

**1** 0.6736

## **Iteration to solve equations 4**

**1** 0.3473

## **Iteration to solve equations 5**

**1** 5.4772

**2** 1.1795

## **Iteration to solve equations: Test (page 1)**

**1** 0.7241

## **Iteration to solve equations: Test (page 2)**

**2** 7.2111

**3** 0.3883