

Bronze Outcome 1 - Graphically

No solutions required.

Bronze Outcome 2 - By factorising



RIGOUR
N5 - Relationships
Exercise 3
Bronze Level

Outcome 2
Working with Quadratic Equations - Factorising

Solve the following quadratic equations...

Examples...

Solve the following quadratic equations...

$(x-2)(x+3) = 0$
 $x-2=0$ or $x+3=0$
 $x=2$ or $x=-3$

$(x+6)(x-2) = 0$
 $x+6=0$ or $x-2=0$
 $x=-6$ or $x=2$

$x(x+7) = 0$
 $x=0$ or $x+7=0$
 $x=0$ or $x=-7$

1. $x = -7$ and $x = 3$ 2. $x = -5$ and $x = 3$
3. $x = -10$ and $x = -12$ 4. $x = -6$ and $x = 9$
5. $x = 1$ and $x = -11$ 6. $x = -4$ and $x = 9$
7. $x = 0$ and $x = 3$ 8. $x = 0$ and $x = -10$
9. $x = 0$ and $x = -8$ 10. $x = 0$ and $x = 9$

$$\textcircled{1} (x+7)(x-3) = 0$$

$$\downarrow \quad \downarrow$$

$$x+7=0 \quad x-3=0$$

$$\downarrow \quad \downarrow$$

$$x=-7 \quad x=3$$

Rigour Maths

$$\textcircled{2} (x-5)(x-3) = 0$$

$$\downarrow \quad \downarrow$$

$$x-5=0 \quad x-3=0$$

$$\downarrow \quad \downarrow$$

$$x=5 \quad x=3$$

$$\textcircled{5} (x-1)(x+11) = 0$$

$$\downarrow \quad \downarrow$$

$$x-1=0 \quad x+11=0$$

$$\downarrow \quad \downarrow$$

$$x=1 \quad x=-11$$

$$\textcircled{3} (x+10)(x+12) = 0$$

$$\downarrow \quad \downarrow$$

$$x+10=0 \quad x+12=0$$

$$\downarrow \quad \downarrow$$

$$x=-10 \quad x=-12$$

$$\textcircled{6} (x+4)(x-4) = 0$$

$$\downarrow \quad \downarrow$$

$$x+4=0 \quad x-4=0$$

$$\downarrow \quad \downarrow$$

$$x=-4 \quad x=4$$

$$\textcircled{4} x(x+16) = 0$$

$$\downarrow \quad \downarrow$$

$$x+16=0$$

$$\downarrow$$

$$x=-16$$

$$x=0 \quad x=-16$$

$$\textcircled{9} 5x(x+8) = 0$$

$$\downarrow \quad \downarrow$$

$$5x=0 \quad x+8=0$$

$$\downarrow \quad \downarrow$$

$$x=0 \quad x=-8$$

$$\textcircled{7} (x+6)(x-9) = 0$$

$$\downarrow \quad \downarrow$$

$$x+6=0 \quad x-9=0$$

$$\downarrow \quad \downarrow$$

$$x=-6 \quad x=9$$

$$\textcircled{8} x(x-3) = 0$$

$$\downarrow \quad \downarrow$$

$$x-3=0$$

$$\downarrow$$

$$x=3$$

$$x=0 \quad x=3$$

$$\textcircled{10} 3x(x-9) = 0$$

$$\downarrow \quad \downarrow$$

$$3x=0 \quad x-9=0$$

$$\downarrow \quad \downarrow$$

$$x=0 \quad x=9$$

Bronze Outcome 3 - By using the quadratic formula

RIGOUR
N5 - Relationships
Exercise 3
Bronze Level

Outcome 3
Working with Quadratic Equations - Quadratic Formula

Solve the following quadratic equations rounding your solutions to 1 decimal place...

Examples...

Solve $x^2 + 4x + 2 = 0$ giving your solutions to 1 decimal place.

$a=1 \quad b=4 \quad c=2$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{-4 \pm \sqrt{16 - 4(2)}}{2 \times 1}$

$= \frac{-4 \pm \sqrt{8}}{2}$

$= \frac{-4 \pm 2\sqrt{2}}{2}$

$= -2 \pm \sqrt{2}$

$x = -3.4$ and $x = -0.6$

1. $x = -7.7$ and $x = -0.3$ 2. $x = -4.8$ and $x = -0.2$
3. $x = -2.6$ and $x = -0.4$ 4. $x = -5.4$ and $x = -0.6$
5. $x = -2.8$ and $x = -0.7$ 6. $x = -2.4$ and $x = -0.3$
7. $x = -11.6$ and $x = -0.4$ 8. $x = -9.9$ and $x = -0.1$
9. $x = -8.6$ and $x = -0.2$ 10. $x = -1.9$ and $x = -0.5$

Rigour Maths

$$\textcircled{1} a=1 \quad b=8 \quad c=2$$

$$\frac{-8 \pm \sqrt{64 - 4(2)}}{2 \times 1}$$

$$= \frac{-8 \pm \sqrt{56}}{2}$$

$$= \frac{-8 - \sqrt{56}}{2} \text{ and } \frac{-8 + \sqrt{56}}{2}$$

$$x = -7.7 \text{ and } x = -0.3$$

$$\textcircled{2} a=1 \quad b=5 \quad c=1$$

$$\frac{-5 \pm \sqrt{25 - 4(1)}}{2 \times 1}$$

$$= \frac{-5 \pm \sqrt{21}}{2}$$

$$= \frac{-5 - \sqrt{21}}{2} \text{ and } \frac{-5 + \sqrt{21}}{2}$$

$$x = -4.8 \text{ and } x = -0.2$$

$$\textcircled{3} a=1 \quad b=3 \quad c=1$$

$$\frac{-3 \pm \sqrt{9 - 4(1)}}{2 \times 1}$$

$$= \frac{-3 \pm \sqrt{5}}{2}$$

$$= \frac{-3 - \sqrt{5}}{2} \text{ and } \frac{-3 + \sqrt{5}}{2}$$

$$x = -2.6 \text{ and } x = -0.4$$

$$\textcircled{4} a=1 \quad b=6 \quad c=3$$

$$\frac{-6 \pm \sqrt{36 - 4(3)}}{2 \times 1}$$

$$= \frac{-6 \pm \sqrt{24}}{2}$$

$$= \frac{-6 - \sqrt{24}}{2} \text{ and } \frac{-6 + \sqrt{24}}{2}$$

$$x = -5.4 \text{ and } x = -0.6$$

$$\textcircled{5} a=2 \quad b=7 \quad c=4$$

$$\frac{-7 \pm \sqrt{49 - 4(8)}}{2 \times 2}$$

$$= \frac{-7 \pm \sqrt{17}}{4}$$

$$= \frac{-7 - \sqrt{17}}{4} \text{ and } \frac{-7 + \sqrt{17}}{4}$$

$$x = -2.8 \text{ and } x = -0.7$$

$$\textcircled{6} a=3 \quad b=8 \quad c=2$$

$$\frac{-8 \pm \sqrt{64 - 4(6)}}{2 \times 3}$$

$$= \frac{-8 \pm \sqrt{40}}{6}$$

$$= \frac{-8 - \sqrt{40}}{6} \text{ and } \frac{-8 + \sqrt{40}}{6}$$

$$x = -2.4 \text{ and } x = -0.3$$

$$\textcircled{7} a=1 \quad b=12 \quad c=5$$

$$\frac{-12 \pm \sqrt{144 - 4(5)}}{2 \times 1}$$

$$= \frac{-12 \pm \sqrt{124}}{2}$$

$$= \frac{-12 - \sqrt{124}}{2} \text{ and } \frac{-12 + \sqrt{124}}{2}$$

$$x = -11.6 \text{ and } x = -0.4$$

$$\textcircled{8} a=2 \quad b=13 \quad c=7$$

$$\frac{-13 \pm \sqrt{169 - 4(2)}}{2 \times 2}$$

$$= \frac{-13 \pm \sqrt{113}}{4}$$

$$= \frac{-13 - \sqrt{113}}{4} \text{ and } \frac{-13 + \sqrt{113}}{4}$$

$$x = -5.9 \text{ and } x = -0.6$$

$$\textcircled{9} a=1 \quad b=9 \quad c=2$$

$$\frac{-9 \pm \sqrt{81 - 4(2)}}{2 \times 1}$$

$$= \frac{-9 \pm \sqrt{73}}{2}$$

$$= \frac{-9 - \sqrt{73}}{2} \text{ and } \frac{-9 + \sqrt{73}}{2}$$

$$x = -8.8 \text{ and } x = -0.2$$

$$\textcircled{10} a=1 \quad b=8 \quad c=4$$

$$\frac{-8 \pm \sqrt{64 - 4(4)}}{2 \times 1}$$

$$= \frac{-8 \pm \sqrt{48}}{2}$$

$$= \frac{-8 - \sqrt{48}}{2} \text{ and } \frac{-8 + \sqrt{48}}{2}$$

$$x = -7.5 \text{ and } x = -0.5$$