

Name Key

Solving Quadratics by Quadratic Formula

Quick Review

If the equation you are solving is not easily factorable, you can always use the quadratic formula.

Given $ax^2 + bx + c = 0$,

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

$$2x^2 - x - 3 = 0$$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{1 \pm \sqrt{25}}{4} = \frac{1 \pm 5}{4}$$

$$x = \frac{1 + 5}{4} = \frac{6}{4} = \boxed{\frac{3}{2}}$$

$$\text{and } x = \frac{1 - 5}{4} = \frac{-4}{4} = \boxed{-1}$$



Use the quadratic formula to solve these equations. Then follow your answers in order through the maze.

1. $x^2 - 3x + 2 = 0$ $x = \underline{1}, \underline{2}$

2. $x^2 - 6x = 0$ $x = \underline{0}, \underline{6}$

3. $8x^2 - 16x + 8 = 0$ $x = \underline{1}$

4. $3x^2 + 6x - 12 = 0$ $x = \underline{-1 \pm \sqrt{5}}$

5. $2x^2 + 3x - 5 = 0$ $x = \underline{-\frac{5}{2}}, \underline{1}$

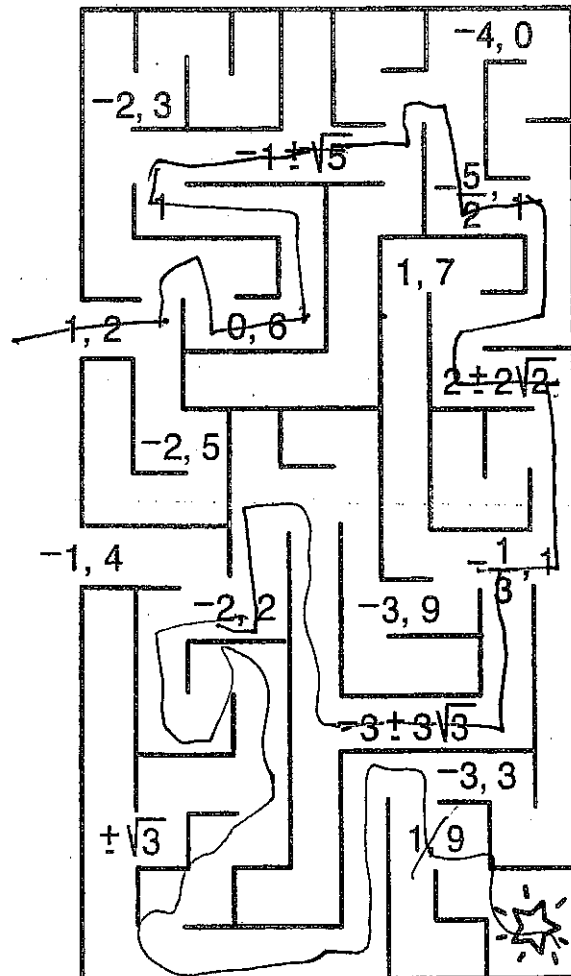
6. $x^2 - 4x - 4 = 0$ $x = \underline{2 \pm 2\sqrt{2}}$

7. $3x^2 - 2x - 1 = 0$ $x = \underline{1}, \underline{-\frac{1}{3}}$

8. $x^2 + 6x - 18 = 0$ $x = \underline{-3 \pm 3\sqrt{3}}$

9. $2x^2 - 8 = 0$ $x = \underline{2}, \underline{-2}$

10. $x^2 - 10x + 9 = 0$ $x = \underline{1}, \underline{9}$



Key

① $x^2 - 3x + 2 = 0$
 $a=1$ $b=-3$ $c=2$

$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(2)}}{2(1)} = \frac{3 \pm \sqrt{1}}{2} = \frac{3+1}{2} = 2$$

② $x^2 - 6x = 0$
 $a=1$ $b=-6$ $c=0$

$$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(0)}}{2(1)} = \frac{6 \pm \sqrt{36}}{2} = \frac{6 \pm 6}{2} = \frac{12}{2} = 6$$

③ $8x^2 - 16x + 8 = 0$
 $a=8$ $b=-16$ $c=8$

$$\frac{-(-16) \pm \sqrt{(-16)^2 - 4(8)(8)}}{2(8)} = \frac{16 \pm \sqrt{256 - 256}}{16} = \frac{16 \pm 0}{16} = 1$$

④ $3x^2 + 6x - 12 = 0$
 $a=3$ $b=6$ $c=-12$

$$\frac{-6 \pm \sqrt{6^2 - 4(3)(-12)}}{2(3)} = \frac{-6 \pm \sqrt{180}}{6} = \frac{-6 \pm 6\sqrt{5}}{6} = -1 \pm \sqrt{5}$$

⑤ $2x^2 + 3x - 5 = 0$
 $a=2$ $b=3$ $c=-5$

$$\frac{-3 \pm \sqrt{3^2 - 4(2)(-5)}}{2(2)} = \frac{-3 \pm \sqrt{49}}{4} = \frac{-3 \pm 7}{4} = \frac{-3+7}{4} = 1$$

⑥ $x^2 - 4x - 4 = 0$
 $a=1$ $b=-4$ $c=-4$

$$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-4)}}{2(1)} = \frac{4 \pm \sqrt{32}}{2} = \frac{4 \pm 4\sqrt{2}}{2} = 2 \pm 2\sqrt{2}$$

⑦ $3x^2 - 2x - 1 = 0$
 $a=3$ $b=-2$ $c=-1$

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-1)}}{2(3)} = \frac{2 \pm \sqrt{16}}{6} = \frac{2 \pm 4}{6} = 1, -\frac{1}{3}$$

⑧ $x^2 + 6x - 18 = 0$
 $a=1$ $b=6$ $c=-18$

$$\frac{-6 \pm \sqrt{6^2 - 4(1)(-18)}}{2(1)} = \frac{-6 \pm \sqrt{108}}{2} = \frac{-6 \pm 6\sqrt{3}}{2} = -3 \pm 3\sqrt{3}$$

⑨ $2x^2 - 8 = 0$
 $a=2$ $b=0$ $c=-8$

$$\frac{-0 \pm \sqrt{0^2 - 4(2)(-8)}}{2(2)} = \frac{0 \pm \sqrt{64}}{4} = \frac{0 \pm 8}{4} = \pm 2$$

⑩ $x^2 - 10x + 9 = 0$
 $a=1$ $b=-10$ $c=9$

$$\frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(9)}}{2(1)} = \frac{10 \pm \sqrt{64}}{2} = \frac{10 \pm 8}{2} = 9, 1$$