

What does it mean to solve a quadratic equation?

Find the value of x when $y=0$.

How many solutions will you always have? 2

What method have you learned up to this point?

Example: $x^2 - 3x + 2 = 0$

$$\begin{array}{r} 2 \mid -3 \\ -2 \cdot -1 \end{array}$$

Factoring

$$(x-2)(x-1) = 0$$

$$x-2=0 \quad x-1=0$$

$$x=2 \quad x=1$$

When would you use square roots to solve a quadratic equation?

When it is in <u>standard</u> form and <u>b = 0</u> $y = ax^2 + bx + c$	When it is in <u>vertex</u> form. $y = a(x-h)^2 + k$
Example: $5x^2 - 180 = 0$ $5x^2 = 180$ $x^2 = 36$ $x = \pm 6$	Example: Solve $2(x+3)^2 = 8$ $\sqrt{(x+3)^2} = \sqrt{4}$ $x+3 = \pm 2$ $-3 \quad -3$ $x = -3+2, -3-2 = -1, -5$

Don't forget that when you take the square root, you need to write \pm !

1-9: Solve each equation using square roots.

1. $3x^2 - 100 = 332$

$$3x^2 = 432$$

$$x^2 = 144$$

$$x = \pm 12$$

2. $\frac{2}{3}x^2 - 8 = 16$

$$\frac{2}{3}x^2 = 24 \cdot \frac{3}{2}$$

$$x^2 = 36$$

$$x = \pm 6$$

3. $\frac{1}{2}x^2 - 5 = 5$

$$\frac{1}{2}x^2 = 10$$

$$x^2 = 20$$

$$x = \pm \sqrt{20} = \pm 2\sqrt{5}$$

4. $x^2 + 1 = 3x^2 - 13$

$$0 = 2x^2 - 14$$

$$2x^2 = 14$$

$$x^2 = 7$$

$$x = \pm \sqrt{7}$$

5. $0 = 12x^2 + 120$

$$12x^2 = -120$$

$$x^2 = -10$$

$$x = \pm \sqrt{-10}$$

$$x = \pm i\sqrt{10}$$

6. $(2x-3)^2 = 25$

$$2x-3 = \pm 5$$

$$2x-3=5$$

$$2x-3=-5$$

$$2x=8$$

$$2x=-2$$

$$x=4$$

$$x=-1$$

7. $3(x-2)^2 + 4 = 52$

$$3(x-2)^2 = 48$$

$$(x-2)^2 = 16$$

$$x-2 = \pm 4$$

$$x = 2+4 \quad 2-4$$

$$x = 6, -2$$

8. $3(x-1)^2 = 12$

$$(x-1)^2 = 4$$

$$x-1 = \pm 2$$

$$x = 1+2 \quad 1-2$$

$$x = 3, -1$$

9. $-3(x+2)^2 = 48$

$$(x+2)^2 = -16$$

$$x+2 = \pm \sqrt{-16}$$

$$x = -2 \pm 4i$$

10-18: Solve each quadratic equation by either factoring or square roots.

10. $x^2 - 49 = 0$
 $(x+7)(x-7) = 0$
 $x = -7, 7$
 or $x^2 = 49$
 $x = \pm 7$

11. $4(x+1)^2 = 24$
 $(x+1)^2 = 6$
 $x+1 = \pm\sqrt{6}$
 $x = -1 \pm \sqrt{6}$

12. $x^2 - 8x + 7 = 0$
 $(x-7)(x-1) = 0$
 $x = 7, -1$

13. $2x^2 - 3x = 2$
 $2x^2 - 3x - 2 = 0$
 $2x^2 - 4x + x - 2$
 $2x(x-2) + 1(x-2)$
 $(x-2)(2x+1) = 0$
 $x = 2, -\frac{1}{2}$

14. $x^2 + 11 = -20$
 $x^2 = -31$
 $x = \pm\sqrt{-31}$
 $x = \pm i\sqrt{31}$

15. $x^2 - 8 = 2x$
 $x^2 - 2x - 8 = 0$
 $(x-4)(x+2) = 0$
 $x = 4, -2$

16. $x^2 = 7x$
 $x^2 - 7x = 0$
 $x(x-7) = 0$
 $x = 0, x-7 = 0$
 $x = 7$

17. $-2(x-3)^2 = 32$
 $(x-3)^2 = -16$
 $x-3 = \pm\sqrt{-16}$
 $x = 3 \pm 4i$

18. $5x^2 + 10x = -2$
 $5x^2 + 10x + 2 = 0$
 Quad. Formula:
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{-4 \pm 3}{2}$
 $\frac{-4 \pm 1}{2}$

$\frac{10 \pm 10}{2}$

$5b^2 = 10^2 = 100$ $a=5$ $b=10$ $c=2$
 $ac = 5 \cdot 2 = 10$
 $2a = 2(5) = 10$
 $\frac{-10 \pm \sqrt{100 - 4(10)}}{2 \cdot 5}$
 $\frac{-10 \pm \sqrt{60}}{10}$ $\frac{-10 \pm \sqrt{4 \cdot 15}}{10} = \frac{-10 \pm 2\sqrt{15}}{10}$
 $\frac{-5 \pm \sqrt{15}}{5}$