

What is each problem asking for?

1. $-\sqrt{25}$ The negative Square Root of 25.
2. $\pm\sqrt{25}$ Both the positive and negative Square Root of 25.
3. $\sqrt{25}$ The positive Square Root of 25.
Also known as the Principal Square Root.

Number	# of Real Square Roots
Pos	Two $\rightarrow \pm$
Zero	One \rightarrow zero itself
Neg	None

Find all real EXACT solutions to each quadratic equation.

1. $72x^2 - 31 = 19$

$$\begin{aligned}
 72x^2 &= 50 \\
 x^2 &= \frac{50}{72} \\
 x^2 &= \frac{25}{36} \\
 x &= \pm \frac{5}{6}
 \end{aligned}$$

2. $\frac{3x^2 - 6}{7} + 2 = 11$

$$\begin{aligned}
 3x^2 - 6 &= 9 \\
 3x^2 - 6 &= 63 \\
 3x^2 &= 69 \\
 x^2 &= 23 \\
 x &= \pm\sqrt{23}
 \end{aligned}$$

Find all real EXACT solutions to each quadratic equation.

3. $6x^2 + 58 = 34$

$$\begin{aligned}
 6x^2 &= -24 \\
 x^2 &= -4 \\
 \text{No real sols.}
 \end{aligned}$$

4. $337 - 3x^2 = 112$

$$\begin{aligned}
 -337 &- 337 \\
 -3x^2 &= -225 \\
 x^2 &= 75 \sqrt{25} \\
 x &= \pm 5\sqrt{3}
 \end{aligned}$$

Factor each completely.

5. $12w^2 - 5w - 2$

Handwritten work for problem 5:
 $\begin{array}{c} -24 \\ \times \\ -8 \end{array}$
 $\begin{array}{c} ac \\ b \\ -5 \end{array}$
 $\begin{array}{c} 3 \\ - \end{array}$

Handwritten work for problem 5:
 $\begin{array}{c} 3w - 2 \\ 4w \end{array}$

$12w^2$	$-8w$
$+ 3w$	-2

 $(3w-2)(4w+1)$

6. $24k^3 - 54k$

Handwritten work for problem 6:
 $6k(4k^2 - 9)$
 $6k(2k+3)$

Find the EXACT solutions to this equation:

$(x+5)^2 + 1 = 37$

Handwritten work for problem 1:
 $-1 \quad -1$

$(x+5)^2 = 36$

$x+5 = \pm 6$

$x = 1, -11$

Find the EXACT solutions to this equation:

$(x-6)^2 - 14 = 3$

Handwritten work for problem 2:
 $(x-6)^2 = 17$

$x-6 = \pm \sqrt{17}$

$x = \pm \sqrt{17} + 6$

Find the EXACT solutions to this equation:

$2(x+1)^2 + 3 = 51$

Handwritten work for problem 3:
 $2(x+1)^2 = 48$

$(x+1)^2 = 24$

$x+1 = \pm 2\sqrt{6}$

$x = \pm 2\sqrt{6} - 1$

Find the EXACT solutions to this equation:

$$(2x - 1)^2 + 83 = 132$$

$$(2x - 1)^2 = 49$$

$$2x - 1 = \pm 7$$

$$2x = 8, -6$$

$$x = 4, -3$$

$$2x - 1 = 7$$

$$2x - 1 = -7$$

Standard Form of a Quadratic Function:

$$y = ax^2 + bx + c$$

Standard Form of a Quadratic Equation:

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

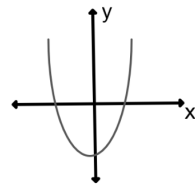
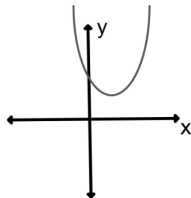
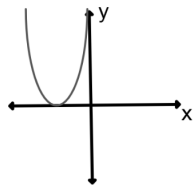
Solutions to quadratic equations using graphs:

Tell the number of solutions to each quadratic equation by using its graph.

1. $0 = x^2 + 4x + 4$

2. $0 = 2x^2 - x + 5$

3. $0 = x^2 + x - 6$



Standard Form of a Quadratic Equation:

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

Solutions to Quadratic Equations are the same as x-intercepts of the graph.

When $y=0$ you are finding x-intercepts!

Can you solve this equation with square roots?

$$x^2 - 3x + 2 = 12$$

No, you can only solve Quadratic Equations using square roots if $b = 0$

In other words, only if the Quadratic Equation is $ax^2 + c = 0$

OR if the equation can be written in this form: $(x \pm h)^2 = c$

What must be true if the product of two numbers is zero?

if $a \cdot b = 0$ either $a = 0$
or
 $b = 0$
or
they both equal zero

Property **Zero-Product Property**

For every real number a and b, if $ab=0$, then $a=0$ or $b=0$

Example: If $(x+3)(x+2)=0$, then $x+3=0$ or $x+2=0$

$$\begin{array}{cc} x + 3 = 0 & \text{or} & x + 2 = 0 \\ -3 & & -2 \end{array}$$

$$x = -3 \qquad x = -2$$

-3 and -2 are called:

- solutions to the equation
- Zeros of the factors
- Roots of the function
- They are also x-intercepts of the parabola

Solve each equation.

1. $(x + 3)(x - 8) = 0$

$$x = -3, 8$$

2. $(4x + 7)(x - 6) = 0$

$x = -\frac{7}{4}, 6$

$$\begin{array}{l} 4x + 7 = 0 \\ x - 6 = 0 \end{array} \quad \begin{array}{l} \frac{4x}{4} = \frac{-7}{4} \\ x = -\frac{7}{4} \end{array}$$

3. $(3x - 1)(x + 11) = 0$

$x = \frac{1}{3}, -11$

4. $2x(x - 2) = 0$

$2x = 0$
 $x = 0, 2$

Find the zero of each factor.

1. $(x + 3)(x - 8) = 0$

2. $(4x + 7)(x - 6) = 0$

3. $(3x - 1)(x + 11) = 0$

4. $2x(x - 2) = 0$

Where are these coming from?

Factoring quadratics!!

Factor each completely.

5. $4x^2 - 12x - 27$

$\begin{array}{r} -108 \\ -18 \end{array} \begin{array}{r} 6 \\ -12 \end{array}$

$2x$	$+3$
$4x^2$	$6x$
$-18x$	-27

$(2x + 3)(2x - 9)$

Solve by factoring

$$4x^2 - 12x - 27 = 0$$

$$(2x - 9)(2x + 3) = 0$$

$$2x - 9 = 0$$

$$x = 9/2$$

$$2x + 3 = 0$$

$$x = -3/2$$

Sec 10-5: Factoring to Solve Quadratic Equations

1. Make sure the Quadratic Equation is in Standard Form

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

2. Factor the Quadratic

3. Find the zeros of each factor

Solve each equation by factoring.

$$x^2 - 8 = 2x$$

$$x^2 - 2x - 8 = 0$$

x^2	$-4x$
$2x$	-8

$$(x-4)(x+2)$$

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

Solve each equation by factoring.

$$7x^2 - 21x = 0$$

$$7x(x-3) = 0$$

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

$$x = 0, 3$$

Solve each equation by factoring.

$$6x^2 + 5x - 21 = 0$$

$$(3x+7)(2x-3) = 0$$

$6x^2$	$14x$
$-9x$	-21

$$3x+7=0 \quad 2x-3=0$$

$$3x=-7 \quad 2x=3$$

$$x=-7/3 \quad x=3/2$$

Solve each equation by factoring.

$$4x^3 + 4x^2 = 120x$$

$$4x^3 + 4x^2 - 120x = 0$$

$$4x(x^2 + x - 30) = 0$$

x^2	$6x$
$-5x$	-30

$$4x(x+6)(x-5) = 0$$

$$x = -6 \quad x = 5$$

$$x = 0$$

Solve each equation by factoring.

$$9w^2 - 49 = 0$$
$$a^2 = b^2 = (a \pm b)$$
$$(3w + 7)(3w - 7) = 0$$
$$w = -\frac{7}{3}, \frac{7}{3}$$

Solve each equation by factoring.

$$3x^2 - 11 = 2x^2 - 4x + 1$$

Solve each equation by factoring.

$$2x^3 - 5x^2 = 18x - 45$$

You can now finish Hwk #28 -- due tomorrow

Sec 10-5

pages 538-539

problems 1-3, 9, 10, 13, 14, 17, 27, 32

IXL #15 - BB.5 & BB.6 due Friday at 4pm!