

Applied Technical Math 11/14

Warm Up IXL

8th Grade

Z.12

Solving Quadratic Equations

I can solve quadratic equations by factoring and by the square root property

Quadratic Equation

An equation with degree of 2 (highest power is 2)

$$x^2 + 4x + 4 = 0 \qquad 2x^2 - 72 = 0$$

Standard Form of a Quadratic Equation

has terms written in order from greatest to least degree

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

$$x^2 + 4x + 4 = 0 \quad \text{and} \quad 2x^2 - 72 = 0$$

are both written in standard form

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Solving Quadratic Equations by Square Root Property

Step 1: Isolate the x^2 term on the left side of the equal sign (solve for x^2)

$$\begin{array}{r} 2x^2 - 72 = 0 \\ +72 \quad +72 \\ \hline \cancel{2}x^2 = \frac{72}{\cancel{2}} \\ x^2 = 36 \end{array}$$

Step 2: Undo the square by taking the square root of both sides (recall this gives 2 answers)

$$x = \pm 6$$

$$\sqrt{x^2} = \sqrt{36}$$
$$x = 6 \text{ or } x = -6$$

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Ex. 1 Solve each equation

A. $x^2 - 81 = 0$
+81 +81

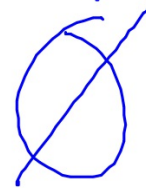
$$\sqrt{x^2} = \sqrt{81}$$
$$x = \pm 9$$

$$x = 9 \text{ or } x = -9$$

B. $-3x^2 - 192 = 0$
+192 +192

$$\frac{-3x^2}{-3} = \frac{192}{-3}$$

$$\sqrt{x^2} = \sqrt{-64}$$



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Solving Quadratic Equations by Factoring

Step 1: Write the equation in standard form

$$ax^2 + bx + c = 0 \qquad x^2 + 4x + 4 = 0$$

Step 2: Find the two binomials that when multiplied together result in the trinomial. (this is basically the reverse of multiplying binomials FOIL)

1st term of quadratic equation must equal the 1st two terms of the binomial expressions multiplied together.

Last term of the quadratic equation must equal the last two terms of the binomial expressions multiplied together

The middle term of the quadratic equation must equal the sum of the inside terms and the outside terms of the binomial multiplied together

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Ex 2 Factor each expression completely

A. $x^2 + 4x + 3$

$$\boxed{(x+1)(x+3)}$$

|
1x
3x
4x

B. $x^2 + 12x + 32$

$$(x+4)(x+8)$$

2 16
4 8

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Ex 3 Factor each expression completely

A. $x^2 - 2x - 8$

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

$$1 \quad -4x \quad +2x \quad 8$$

$$+2 \quad -4$$

$$+2$$

$$-2$$

B. $x^2 - 4x - 32$

$$(x + 4)(x - 8)$$

$$4x \quad -8x$$

~~$$2 \quad 16$$~~

$$+4 \quad -8$$

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Ex 4 Factor each expression completely

A. $x^2 - 5x + 6$

$$(x - 3)(x - 2)$$

$$\begin{array}{cc} -3 & -2 \\ -1 & -6 \end{array}$$

B. $x^2 - 12x + 27$

$$(x - 9)(x - 3)$$

$$\begin{array}{cc} 1 & 27 \\ 9 & 3 \end{array}$$

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Ex 5 Factor each expression completely

A. $x^2 + 4x - 5$

$$(x+5)(x-1)$$

$$-1 + 5$$

$$x^2 - x + 5x - 5$$

$$x^2 + 4x - 5$$

B. $x^2 + 3x - 40$

$$(x+8)(x-5)$$

~~$$20 \cdot 2$$~~

~~$$40 \cdot 1$$~~

~~$$4 \cdot 10$$~~

$$-5 \quad +8$$

I can solve quadratic equations by factoring and by the square root property

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IXL Algebra 1 BB.5

$$(k+1)(k-5)=0$$

$$k+1=0 \quad k-5=0$$

$k = -1$	$k = 5$
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