Quadratic $a \neq 0$ | Standard FORM | Example

**Expression** | $ax^2+bx+c$ | $2x^2+7x+3$

# solutions | $\varnothing$ | $x(x+7)+2(x-5)$

$\sqrt{x^2}$

Factor

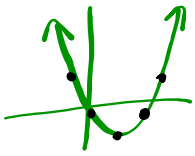
Simplify operations $+, -, \times, \div$

**Equation** | $ax^2+bx+c=0$ | $2x^2+7x+3=0$

# solutions | 2 | Solve

**Function** | $y=ax^2+bx+c$ | $y=2x^2+7x+3$

# solutions | $(x,y)$ Infinitely many



Graph

Find critical values

Discuss characteristics

Honors Algebra 2
Solving Quadratic Equations by Factoring

Name: _____
Date: _____ BLK: _____

UNIT QUESTION: How do we solve quadratic equations algebraically?

Today's Question: How do we solve quadratic equations by factoring?

**Solving Quadratic Equations by Factoring**

1. Write the quadratic equation in standard form if needed. $ax^2+bx+c=0;\ a>0$ +
2. Factor the quadratic expression; it is still an equation that equals zero.
3. Set each factor equal to zero and solve.
4. Check your answers!!!

**Zero Product Property**

If ab = 0, then a = 0 or b = 0
If the product of two factors is zero, then at least one of the factors must be zero.

**Solve each equation by factoring.**

1.) $x^2+7x+10=0$

$(x+5)(x+2)=0$

$x+5=0 \quad x+2=0$

$x=-5, \quad x=-2$

2.) $x^2-2x=0$

$x(x-2)=0$

$x-2=0$

$x=0, \quad x=2$

$\frac{x^2-2x=0}{x \quad x}$

$x-2=0$

$x=2$

Bad math!

3.) $3x^2-75=0$

$3(x^2-25)=0$

$3(x+5)(x-5)=0$

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

$x=-5 \quad x=5$

$x=\pm 5$

$\frac{3x^2-75}{3}=\frac{0}{3}$

$x^2-25=0$

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

$x=-5, 5$

4.) $x^2=10x-25$

$-10x+25 \quad -10x+25$

$x^2-10x+25=0$

$(x-5)(x-5)=0$

$x=5$ repeated
multiplicity 2

5.) $x^2-5x-6=0$

$(x-6)(x+1)=0$

$x=6, -1$

6.) $x^2+2x-48=0$

$(x+8)(x-6)=0$

$x=-8, 6$

7.) $x^2 - 8x = -12$

$x^2 - 8x + 12 = 0$

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

$x = 6, 2$

8.) $x^2 + 5x - 36 = 0$

$(x+9)(x-4) = 0$

$x = -9, 4$

9.) $2x^2 - 11x = 5x - 32$

$-5x+32 \quad -5x+32$

$\frac{2x^2 - 16x + 32}{2} = \frac{0}{2}$

$x^2 - 8x + 16 = 0$

$(x-4)^2 = 0$

$x = 4$ mult. 2

10.) $3x^2 + 15x = x^2 - 7$

$-x^2 + 7 \quad -x^2 + 7$

$2x^2 + 15x + 7 = 0$

$(2x^2 + x) + (14x + 7) = 0$

$x(2x+1) + 7(2x+1) = 0$

$(2x+1)(x+7) = 0 \quad ab = 0$

$x = -\frac{1}{2}, \; x = -7$

$ac = 14 \quad b = 15$

$1 \cdot 14 \quad 15$

$2x + 1 = 0$

$\frac{2x}{2} = \frac{-1}{2}$

11.) $8x^2 = 10x + 3$

$ac = -24 \quad b = -10$

$-12 \cdot 2$

$8x^2 - 10x - 3 = 0$

$(8x^2 - 12x) + (2x - 3) = 0$

$4x(2x-3) + 1(2x-3) = 0$

$(2x-3)(4x+1) = 0$

$x = \frac{3}{2}, \; x = \frac{-1}{4}$

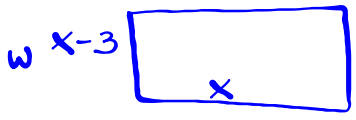
12.) $(x+12)^2 = 0$ Think about it!

$(x+12)(x+12) = 0$

$x = -12$ repeated

OR mult. 2

13.) A rectangle has a width that is 3 feet less than its length.




a. Write an expression for the area of the rectangle. $x(x-3) = x^2 - 3x$

b. If the area is equal to 28 square feet, what is length?

Solve a quadratic equation to answer; no guess-and-check.

$x^2 - 3x = 28$

$x^2 - 3x - 28 = 0$

$(x-7)(x+4) = 0$

$x = 7, \; x = -4$

The length is 7 feet.