

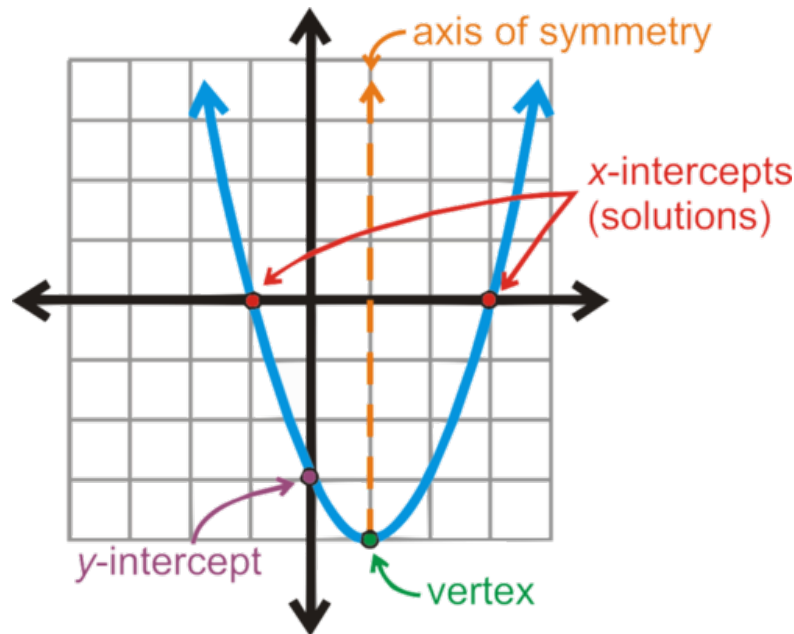
Objective

Students will be able to factor a trinomial where the leading coefficient is equal to 1.

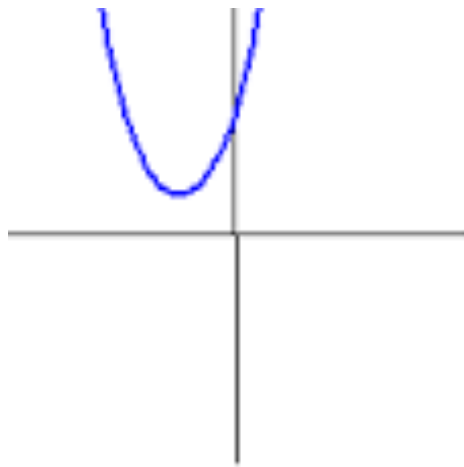
Intro to Quadratics

A quadratic equation in one variable can be written in the form $ax^2 + bx + c = 0$ where $a \neq 0$ (written in standard form). The solutions of a quadratic equation are called the roots, solutions, x-intercepts, and zeros of the equation.

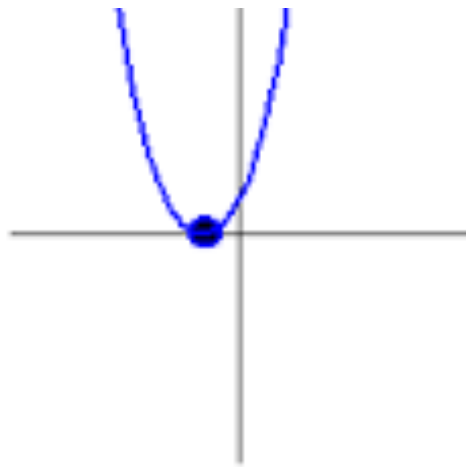
The graph of a quadratic equation is a parabola



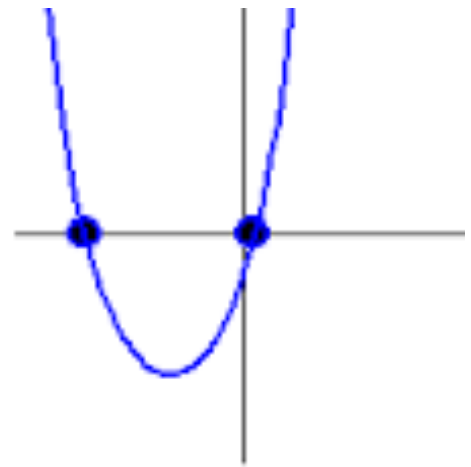
How many solutions can a quadratic equation have?



No Solutions



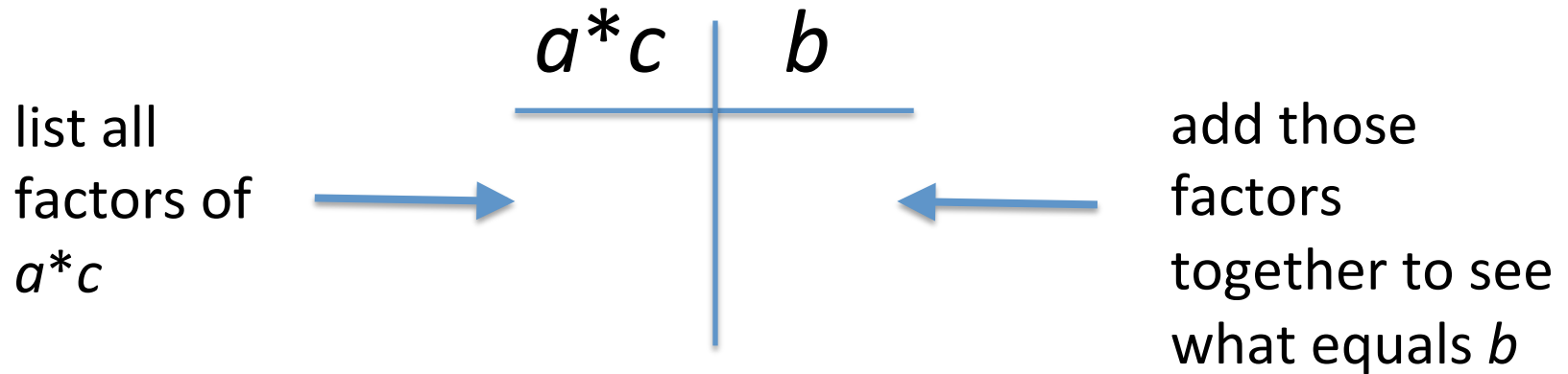
One Solution



Two Solutions

Factoring a trinomial

To factor a trinomial $ax^2 + bx + c$, we need two numbers that multiply together to equal $a*c$ and add together to equal b



$$x^2 + 5x + 6$$

$a*c$	b
6	5
1, 6	7
2, 3	5

$$= (x + 2)(x + 3)$$

You can check to see if your factors are correct by FOIL-ing

An expression that cannot be factored is considered prime.

Examples:

1) $x^2 - 3x - 18$

$a*c$	b
-18	-3
-9, 2	-7
9, -2	7
-18, 1	-17
18, 1	17
-6, 3	-3
6, -3	3

$$= (x - 6)(x + 3)$$

2) $b^2 - 11b + 28$

$$= (b - 4)(b - 7)$$


3) $c^2 + 2c + 4$

prime

$a*c$	b
4	2
2, 2	4
1, 4	5

$a*c$	b
28	-11
1, 28	29
2, 14	16
4, 7	11
-4, -7	-11
-2, -14	-16
-1, -28	-29

Difference of Two Squares

$$a^2 - b^2 = (a + b)(a - b)$$


has to be subtraction

****** a^2 and b^2 are perfect squares

Example:

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

Homework

Factoring Trinomials and Difference of
Two Squares WS

Objective

Students will be able to factor a trinomial where the leading coefficient is greater than 1.

First math team practice is Tuesday, September 20th at 3:30 pm in room 305

Greatest Common Factor

A whole number that is a factor of two or more nonzero whole numbers is a common factor of the numbers. The largest of the common factors is the greatest common factor (GCF).

What is the GCF of 12 and 16? 4

What is the GCF of $4a$ and $2a$? $2a$

GCF when Factoring

When you factor any relation, you should
pull out the GCF as your first step!

For the following examples, what is the GCF and how would your first step to factoring look like?

$$1) \quad 2x^2 + 2x + 4 \qquad \text{GCF} = 2 \qquad 2(x^2 + x + 2)$$

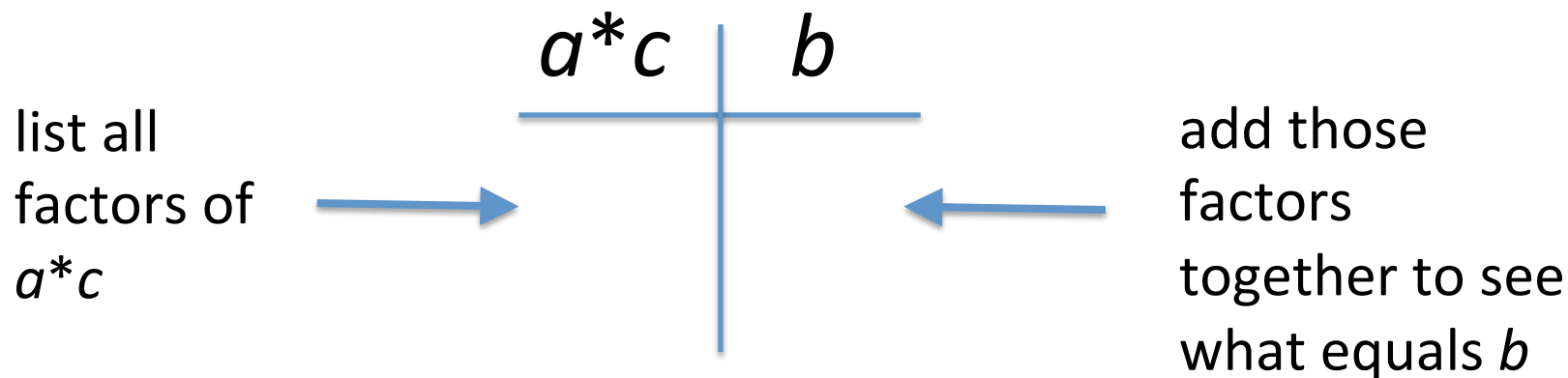
$$2) \quad 3x^2 - 30x + 15 \qquad \text{GCF} = 3 \qquad 3(x^2 - 10x + 5)$$

$$3) \quad 24x^3 + 30x^2 - 12x \qquad \text{GCF} = 6x \qquad 6x(4x^2 + 5x - 2)$$

****Pulling out a GCF is like the opposite of distributing**

Factoring a trinomial ($a > 1$)

To factor a trinomial $ax^2 + bx + c$ where $a > 1$, we need two numbers that multiply together to equal $a*c$ and add together to equal b



HOWEVER, now that $a > 1$, these factors are what we use to split the middle term (factor by grouping)!

Factoring when $a > 1$

Example:

$a*c$	b
$2*3$	
6	7
6, 1	7

$$2x^2 + 7x + 3 =$$

1) split the middle term

2) factor by grouping

3) GCF of each group

$$(2x^2 + 6x) + (x + 3) =$$

$$2x(x + 3) + (x + 3) =$$

want these to be the same in order to take out the GCF again

$$(x + 3)(2x + 1)$$

Rally Coach

With a partner, factor the following problems. One of you will be writing while the other one listens and watches you solve the problem. The partner that is watching should be coaching their partner and praising them for good work. Once you finish a problem, switch roles.

Partner One:

1) $6x^2y + 3xy - 12y$

2) $8c^2 - 10c - 3$

3) $-12x^2 + 22x - 8$

Partner Two:

1) $8a^3b + 10ab - 4a^2b$

2) $6x^2 + 19x + 10$

3) $-8b^2 + 28b + 60$

Rally Coach Answers

Partner One:

1) $3y(2x^2 + x - 4)$

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

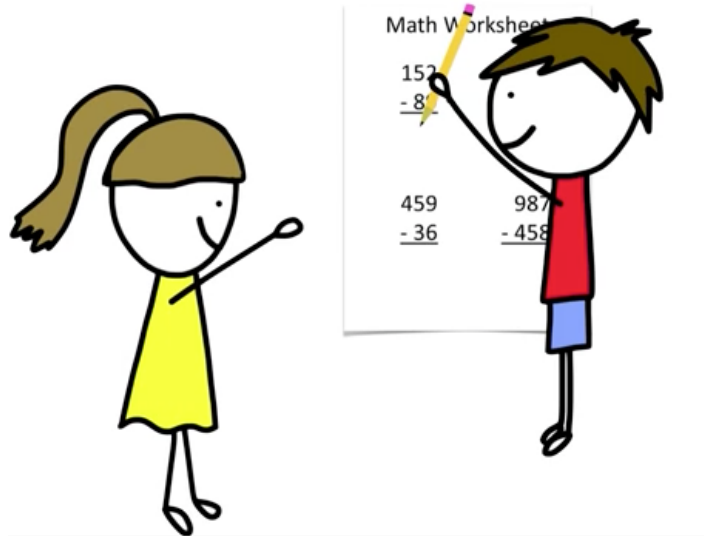
3) $2(-2x + 1)(3x - 4)$

Partner Two:

1) $2ab(4a^2 + 5 - 2a)$

2) $(3x + 2)(2x + 5)$

3) $4(-x + 5)(2x + 3)$



Homework

Day 2: GCF & Factoring Trinomials $a > 1$ WS

QUIZ on Algebra Review on **Tuesday!**

Class notes are posted on my website!

Objectives

Students will be able to solve trinomials by factoring.

Students will be able to use the quadratic formula to solve trinomials.

Algebra Review Quest is tomorrow!

Math tutoring during lunch and after school in room 341 is now available!

What is the difference
between factoring and
solving?

What is Zero Product Property?

If the product of two expressions is zero, then one or both of the expressions equal zero.

If A and B are expressions and $AB = 0$, then $A = 0$ or $B = 0$

Example: If $(x + 5)(x + 2) = 0$, then $x + 5 = 0$ or $x + 2 = 0$.

So $x = -5$ or $x = -2$

Solve the following problems:

1) $a^2 + 3a - 28 = 0$

$a = -7$ or $a = 4$

2) $8c^2 - 10c - 3 = 0$

$c = -1/4$ or $c = 3/2$

3) $6x^2 + 19x + 10 = 0$

$x = -2/3$ or $x = -5/2$

4) $3x^2 - 10x = -6$

prime

Is there a way to find the solutions to prime polynomials?

The Quadratic Formula

Let a , b , and c be real numbers such that $a \neq 0$.
The solutions of the quadratic equation
 $ax^2 + bx + c = 0$ are:

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

The quadratic formula gives the solution to any quadratic equation

Example:

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

$3x^2 - 10x + 6 = 0$ is prime, but we can use the quadratic formula to solve for the solutions/roots/x-intercepts/zeros.

$$a = 3, b = -10, c = 6$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(6)}}{2(3)}$$

**simplify the radical!

$$= \frac{10 \pm \sqrt{100 - 72}}{6} = \frac{10 \pm \sqrt{28}}{6} = \frac{10 \pm 2\sqrt{7}}{6} = \frac{5 \pm \sqrt{7}}{3}$$

**simplify fraction!