A statistician collected the following data to explore the relationship between two variables, *x* and *y*.

x	***y***
2.3	11.0
4.2	16.5
5.1	19.2
6.4	23.1
8.2	24.3
8.5	29.5

The statistician performed a linear regression and also plotted the residuals.

- Based on the residual plot, the statistician decided to exclude one data point.
- The statistician then performed linear regression on the set of remaining data points.
- The result was that the new linear model fit the remaining data more closely than the original model fit the original data.

Which data point did the statistician exclude?

A (2.3, 11.0)

B (4.2, 16.5)

C (6.4, 23.1)

D (8.2, 24.3)

Three systems of equations are shown in the table below.

Place (click and drag) the choice that describes the number of solutions of each system into the appropriate column in the table below.

$2x + 2y = 16$ $4x + 3y = 27$	$2x + 2y = 8$ $4x + 4y = 16$	$2x + 3y = 12$ $2x + 3y = 18$

one solution	**no solution**	**infinitely many solutions**

Assignments:

- Math One-Pagers are due today!
  - Four required for everyone for a formal grade
  - Seven will exempt your lowest FBF
  - Ten will replace your lowest FBF with a 10/10
- Last FBF is due today! Code FBF4
- EOC on May 30th

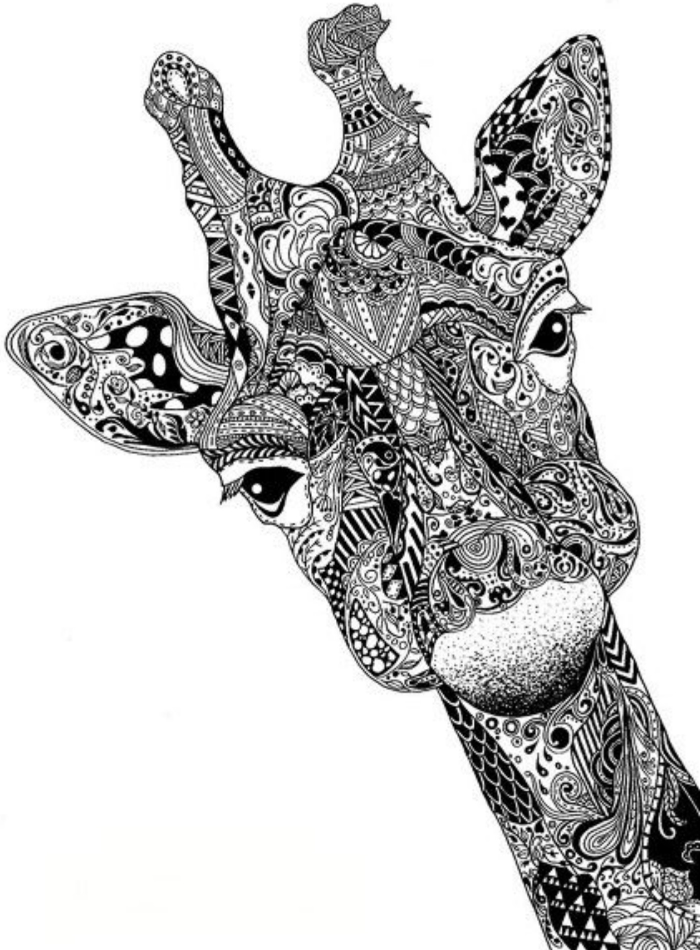
Announcements

- Today - Chromebooks stay at school
- May 22nd - NO HOMEWORK
- Textbooks due Friday, May 24
- Hidden Figures books due Friday, May 24
- Calculator collection on Friday, May 24
- *Anything forgotten on Friday, May 24th can be turned in on Tuesday, May 28th*

EOC Review
Day 11

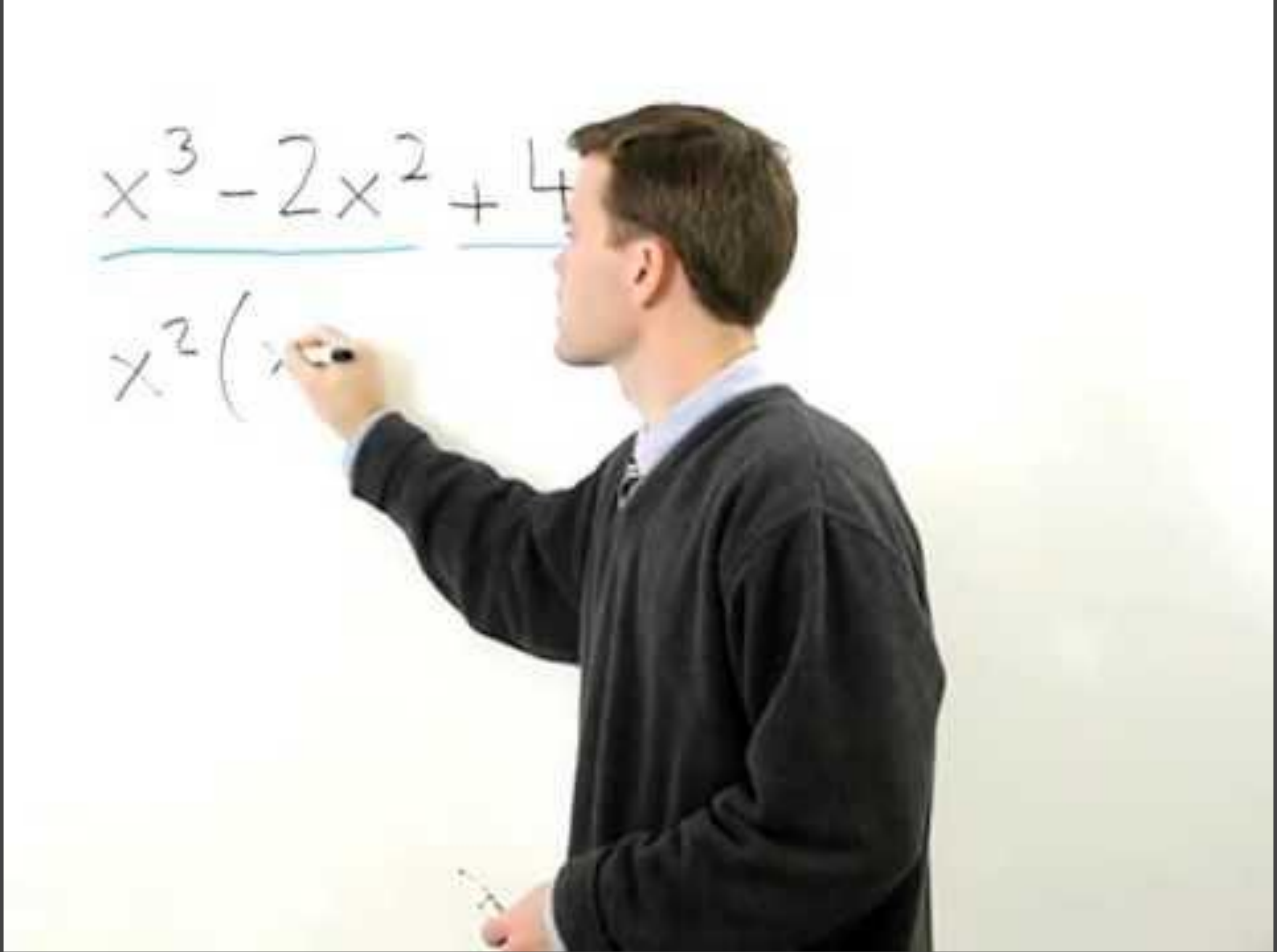
Unit 13-14 Review

5/20/2019



Unit 13

Factoring


$x^3 - 2x^2 + 4$
$x^2($

Math 1

Factor By Grouping

Factor by Grouping: A way of factoring a polynomial with _______ terms!

Essential Understanding: polynomials of a degree greater than 2 can be factored

IF THERE IS A GCF, YOUR FIRST STEP IS <u>ALWAYS</u> TO PULL IT OUT

Example 2: Factor $8t^3 + 14t^2 + 20t + 35$

How to Factor a Trinomial in the Form $ax^2 + bx + c$

Step 1: Multiply your first term (a) and your last term (c)
Step 2: Set up your ***T chart*** (what multiplies to "ac" that adds to "b
Step 3: Replace the original (b) term with the two numbers you just came up with
Step 4: Factor by grouping
Step 5 Factor out another GCF if one exists
Step 6: FOIL to check work! (Don't forget your GCF in front)!

Factors	Sums

What is the factored form of $x^2 + 8x + 15$?

List the pairs of factors of 15. Identify the pair that has a sum of 8.

Factors of 15	Sum of Factors
1 and 15	16
3 and 5	8 ✔

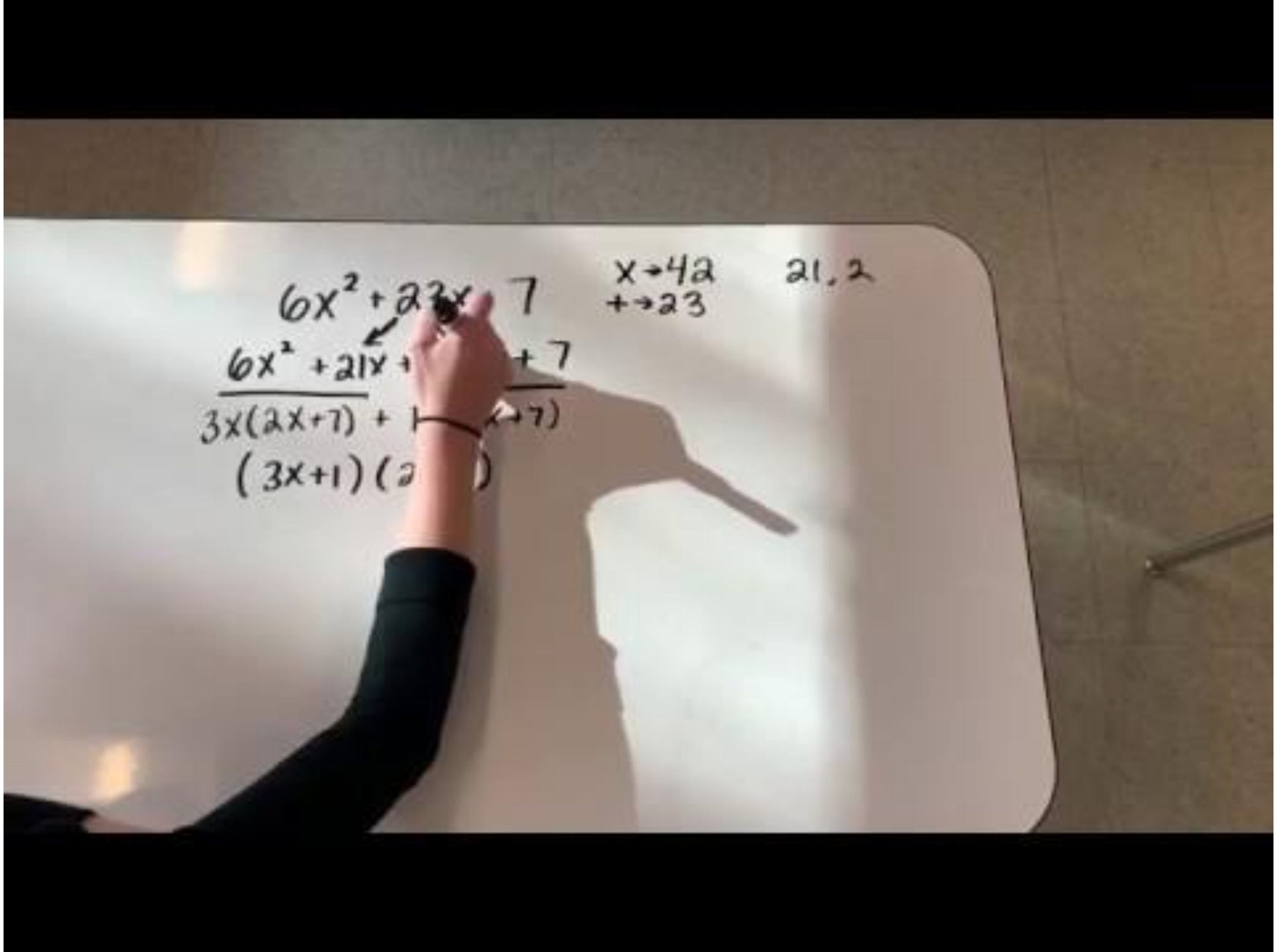
$$x^2 + 8x + 15 = (x + 3)(x + 5)$$

Check $(x + 3)(x + 5) = x^2 + 5x + 3x + 15$

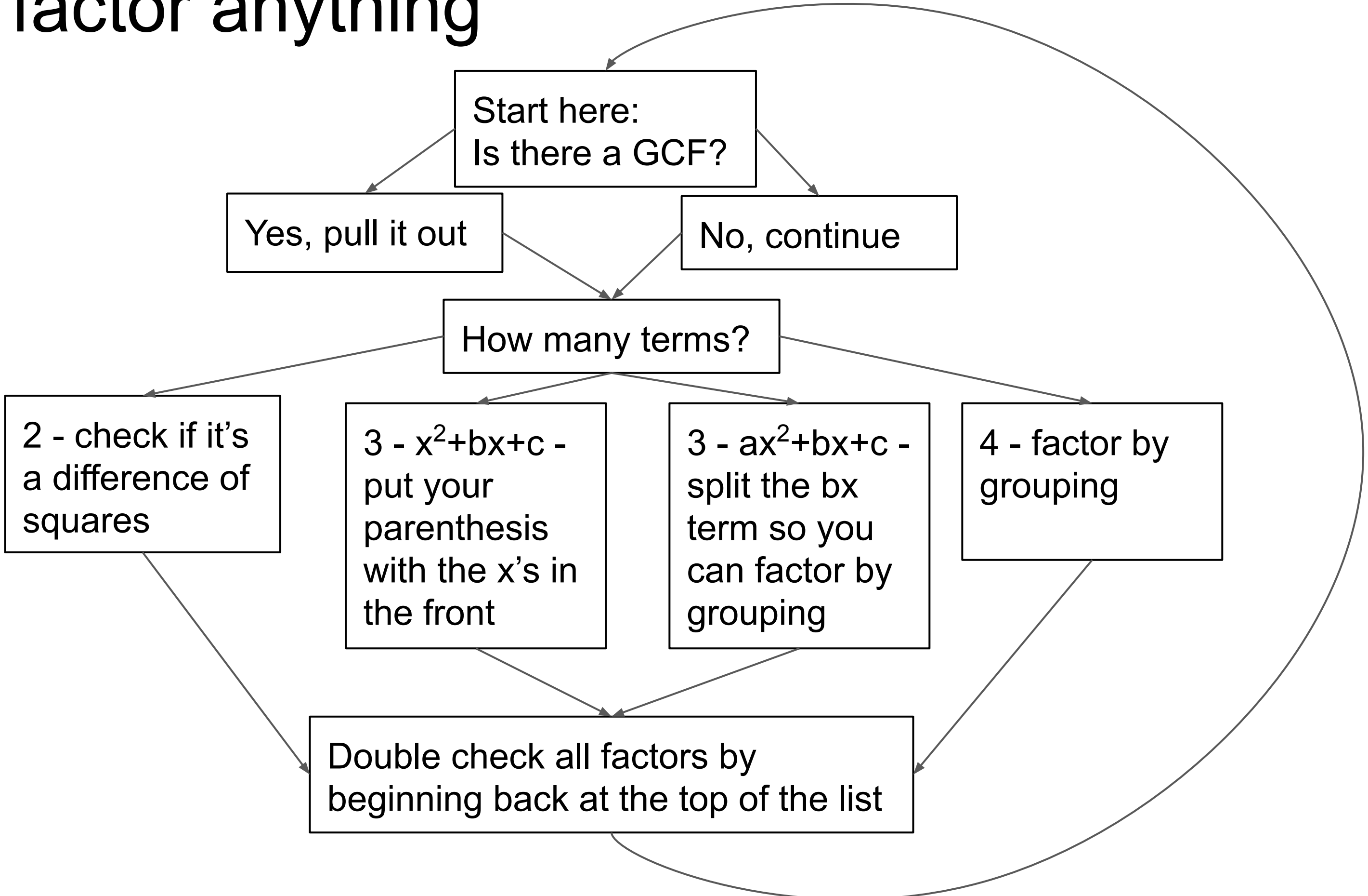
$$= x^2 + 8x + 15 \quad ✔$$

Practice: $r^2 + 11r + 24$

Practice: $y^2 - 6y + 8$


6x² + 23x 7
x → 42
+ → 23
21, 2
6x² + 21x +
+ 7
3x(2x+7) +
(3x+1)(2

How to factor anything



Unit 14

Quadratics

A quadratic function is a type of nonlinear function that models certain situations where the rate of change is not constant. The graph of a quadratic function is a symmetric curve with the highest or lowest point corresponding to the maximum or minimum value.

take note

Key Concept Standard Form of a Quadratic Function

A **quadratic function** is a function that can be written in the form $y = ax^2 + bx + c$, where $a \neq 0$. This form is called the **standard form of a quadratic function.**

Examples $y = 3x^2$ $y = x^2 + 9$ $y = x^2 - x - 2$

Important Vocabulary

Y-Intercept → Where the graph crosses the y-axis

X-Intercept (root, zero, solution) → Where the graph crosses the x-axis. These are the solutions to the quadratic. They are also called roots or zeros of the equation.

Vertex → The highest or lowest point of the parabola

Axis of Symmetry → The line that divides the parabola into two matching halves. Each side matches exactly

Parabola → The graph of the quadratic function which is in the shape of a U

Axis of Symmetry

AOS Formula:

$$\frac{-b}{2a}$$

take note

Key Concept **Graph of a Quadratic Function**

The graph of $y = ax^2 + bx + c$, where $a \neq 0$, has the line $x = \frac{-b}{2a}$ as its axis of symmetry. The x-coordinate of the vertex is $\frac{-b}{2a}$.

Use the axis of symmetry to graph

What is the graph of the function $y=x^2-6x+4$?

Step 1: Find the axis of symmetry

Step 2: find two other points on the graph

Step 3: Graph the vertex and the points you found in Step 2. Reflect these points across the axis of symmetry

Step 1: Solve for the Axis of Symmetry using the AOS Formula
Step 2: Substitute AOS into the equation for x.
Step 3: Solve for y.
Step 4: Write the vertex as an ordered pair (x, y)

Example 1: Find the vertex and the axis of symmetry for each function.

a) $y = -2x^2 + 4x - 9$

b) $y = x^2 - 10$

c) $y = x^2 + 4x - 1$

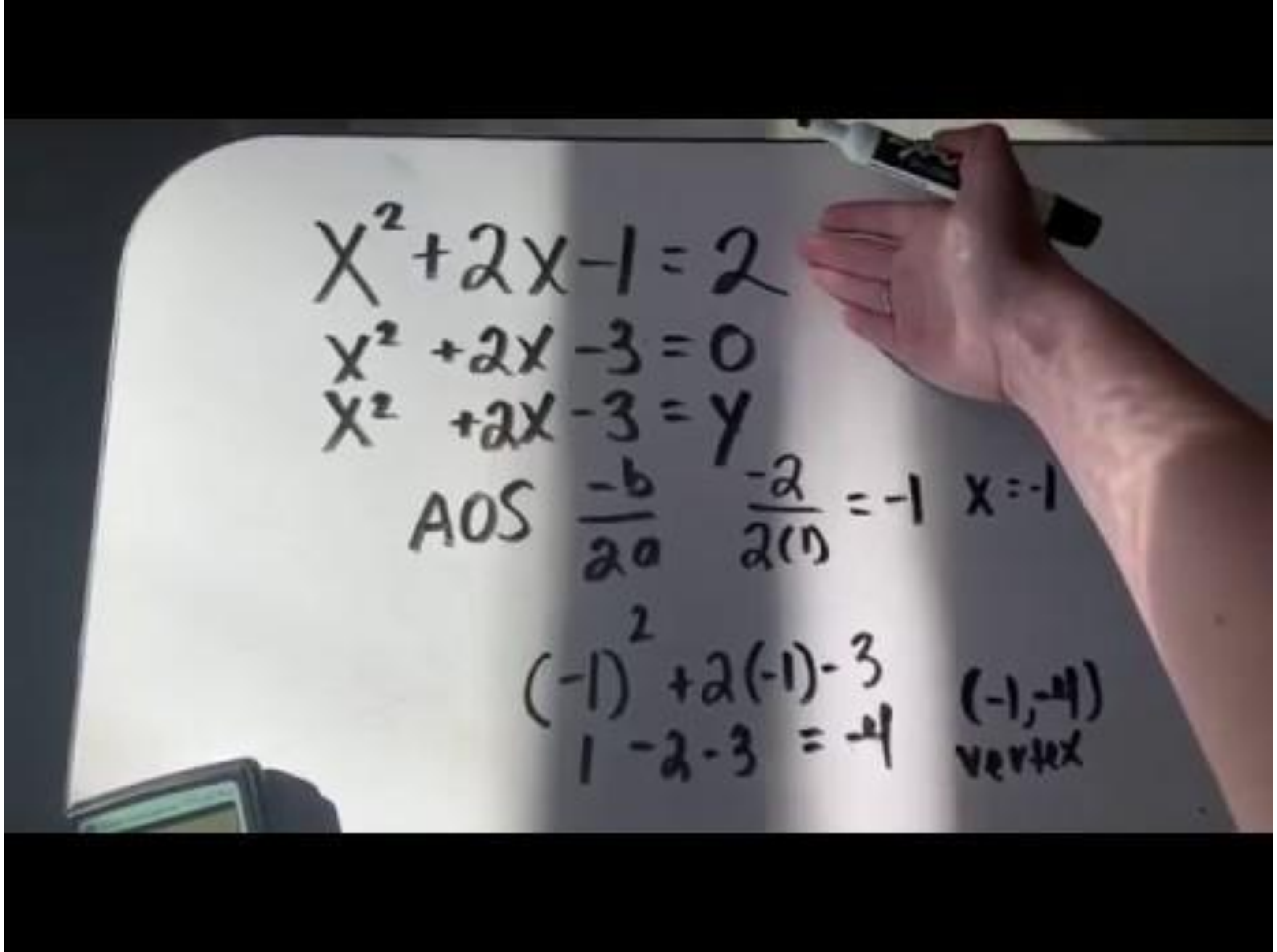
a= -2
b= 4
c= -9

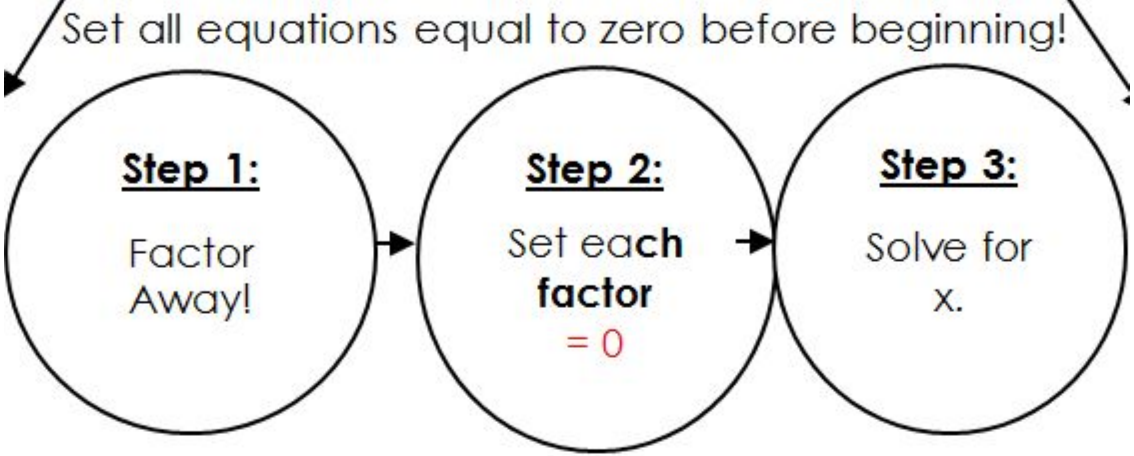
$$AOS = \frac{-b}{2a} = \frac{-4}{2 \bullet -2}$$

$x = 1$ so x coordinate of the vertex is 1

$$Y = -2(1^2) + 4(1) - 9$$
$$= -7$$

$\therefore$ (1, -7) is the vertex


$x^2+2x-1=2$
$x^2+2x-3=0$
$x^2+2x-3=y$
AOS $\frac{-b}{2a}$ $\frac{-2}{2(1)}=-1$ $x=-1$
$(-1)^2+2(-1)-3$
$1-2-3=-4$
$(-1,-4)$
vertex



Practice:

a. $m^2 - 5m - 14 = 0$

b. $p^2 + p - 20 = 0$

c. $2a^2 - 15a + 18 = 0$

The solutions of a quadratic equation of the form $ax^2 + bx + c = 0$ are given by the following formula:

The Quadratic Formula

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

take note

Key Concept Quadratic Formula

Algebra

If $ax^2 + bx + c = 0$, and $a \neq 0$, then

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

Example

Suppose $2x^2 + 3x - 5 = 0$. Then $a = 2$, $b = 3$, and $c = -5$. Therefore

$$x = \frac{-(3) \pm \sqrt{(3)^2 - 4(2)(-5)}}{2(2)}$$

What are the solutions of $x^2 - 8 = 2x$? Use the quadratic formula.

$x^2 - 2x - 8 = 0$	Write the equation in standard form.
$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Use the quadratic formula.
$x = \dfrac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-8)}}{2(1)}$	Substitute 1 for a, -2 for b, and -8 for c.
$x = \dfrac{2 \pm \sqrt{36}}{2}$	Simplify.
$x = \dfrac{2 + 6}{2}$ or $x = \dfrac{2 - 6}{2}$	Write as two equations.
$x = 4$ or $x = -2$	Simplify.

What are the roots of the equation $x^2 - 4x = -4$? Use the quadratic formula to solve.

7. $2x^2 + 5x + 3 = 0$
8. $5x^2 + 16x - 84 = 0$
9. $4x^2 + 7x - 15 = 0$
10. $3x^2 - 41x = -110$
11. $18x^2 - 45x - 50 = 0$
12. $3x^2 + 44x = -96$
13. $3x^2 + 19x = 154$
14. $2x^2 - x - 120 = 0$
15. $5x^2 - 47x = 156$

Quadratic equations can have two, one, or no real - number solutions

You can determine how many real - number solutions it has by using the discriminates.

The discriminant is the expression under the radical sign in the quadratic formula.

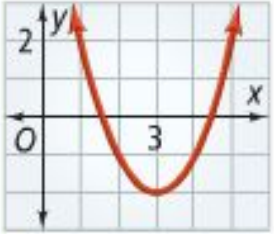
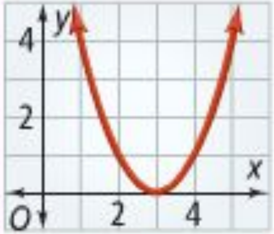
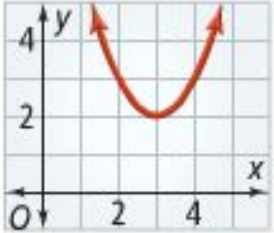
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

the discriminant

The discriminant of a quadratic equation can be positive, zero, or negative.

take note

Key Concept Using the Discriminant

Discriminant	$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	$b^2 - 4ac < 0$
Example	$x^2 - 6x + 7 = 0$ The discriminant is $(-6)^2 - 4(1)(7) = 8$, which is positive. 	$x^2 - 6x + 9 = 0$ The discriminant is $(-6)^2 - 4(1)(9) = 0$. 	$x^2 - 6x + 11 = 0$ The discriminant is $(-6)^2 - 4(1)(11) = -8$, which is negative. 
Number of Solutions	There are two real-number solutions.	There is one real-number solution.	There are no real-number solutions.

How many solutions?

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

30. $x^2 + 7x - 5 = 0$

31. $x^2 + 3x + 11 = 0$

32. $x^2 - 15 = 0$

33. $x^2 + 2x = 0$

34. $9x^2 + 12x + 4 = 0$

Vertex Form of a Quadratic

SWBAT graph a quadratic equation in vertex form.

Vertex Form:

Where (h, k) is the vertex

The vertex form of a quadratic function is given by $f(x) = a(x - h)^2 + k$, where (h, k) is the vertex of the parabola.

Unit 15

Statistics - Tuesday

Unit 16

Geometry - Tuesday

Homework

1. Get rid of zeros in PowerSchool
2. Study