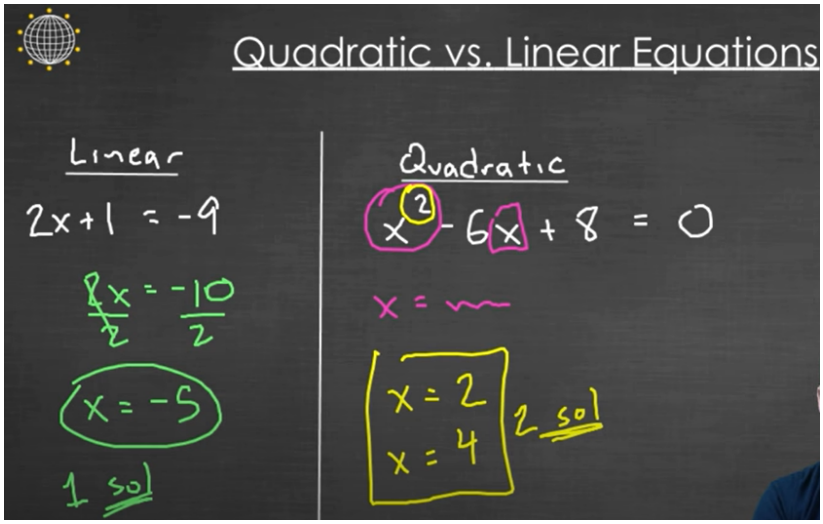
Geometry – Week of April 20 Packet

Reviewing Algebra – Assignment #1

Linear vs. Quadratic Equations



Linear equations will have NO Exponent. We can solve these using rules we've used all year.

Steps to Solve a Linear Equation:

Instructions

Difficulty: Easy

1 $3(x + 8) - 7 = 50$
$3x + 24 - 7 = 50$
Remove any parentheses in your linear equation first. Do this by multiplying the variable closest to the left of the parentheses to each value inside the parentheses.

2 $3(x + 8) - 7 = 50$
$3x + 24 - 7 = 50$
$3x + 17 = 50$
Combine all the like terms in your equation. In the example equation, that would mean adding 7 to - 27.

3 $3(x + 8) - 7 = 50$
$3x + 24 - 7 = 50$
$3x + 17 = 50$
$-17 = -17$
$3x = 33$
Isolate the variable to solve by doing the same process to both sides. If your original equation called for you to add a number to your variable, subtract that number from both sides. If originally multiplying a number to the variable, divide both sides by that same number and so on.

4 $3(11 + 8) - 7 = 50$
$3(19) - 7 = 50$
$57 - 7 = 50$
Plug in your answer to check your work.

Quadratic Equations will have an EXPONENT OF 2 (called SQUARED).

Example: $x^2 = 5$

Or $x^2 + 2x = 12$ ….. notice your x term appears twice here, once with and once without the variable. Since there is a squared term, this is a quadratic.

Over the next month we will be learning methods to solve Quadratic Equations.

Complete the Table Below

Is the Equation Linear, Quadratic or Neither? If it is linear, solve the equation

Equation	Linear, Quadratic or Neither?	How do you know?	Solve if Linear
$3(x - 3) = 27$	Linear	There is an x term with no exponent	$3(x - 3) = 27$ $3x - 9 = 27$ $3x = 36$ $x = 12$
$x^2 - 6x = 15$	Quadratic	There is an x term with a power of 2	
$2x^3 - x^2 = 17$	Neither	There is an x term with a power bigger than 2.	
$x^3 = 8$			
$24 = x + 12$			
$x^2 = 9x^2 - 15 + 1$			
$3x - 2 = 2(x + 5)$			
$27x = 8 + 3x^2$			
$24 = x + 12 - x^4$			

Part 3 – Solve Equation by Taking the Square Root

Solving Quadratics is different than solving linear equations because you have an x squared value. We will explore ways to solve quadratics. The first method we will look at is solving quadratics by taking the square root. This method only works when you have an x squared term in your equation and no other variable term.

Look Closely at the table below. Can you identify the fact that the equations on the left have only an x squared term and the equations on the right have both an x term and an x squared term?

You can solve these problems by taking square root	You can not solve these problems by taking the square root
$x^2 = 25$	$x^2 + x = 25$
$5x^2 = 125$	$5x^2 + 5x = 125$
$5x^2 + 27 = 152$	$5x^2 + 27 = 152x$
$2x^2 + 152 = 7x^2 + 27$	$2x^2 + 152 = 7x + 27$
$(x - 5)^2 = 16$	

To solve by taking the square root:

Step 1: Isolate the x square term, just like you would if you were solving a linear equation.

Step 2: Take the square root of both sides of the equation

Step 3: Write your answer as + or –

Examples:

$$5x^2 - 45 = 0$$
$$5x^2 = 45$$
$$x^2 = 9$$
$$x = \pm\sqrt{9}$$
$$= \pm 3$$

$$(x-7)^2 = 81$$
$$(x-7) = \pm\sqrt{81}$$
$$x - 7 = \pm 9$$
$$x = 7 \pm 9$$
$$x = 16 \text{ or } x = -2$$

$$7x^2 - 5 = 23$$
$$7x^2 = 28$$
$$x^2 = 4$$
$$\sqrt{x^2} = \pm\sqrt{4}$$
$$x = \pm 2$$

Solve Each Problem by Isolating the x squared term, then taking the square root:

$x^2 = 25$	$2x^2 = 98$
$x^2 + 64 = 0$	$9x^2 - 16 = 0$
$x^2 + 9 = 25$	$(x-2)^2 = 25$
$(x-2)^2 + 9 = 25$	$4(x-2)^2 + 9 = 25$