

Week 5 Lesson: Intro to Quadratic Functions

Directions:

1. Take out a piece of notebook or graph paper to take notes on.
2. Do Khan Academy
3. Watch [this video here](#). Click that link to watch a video and take notes.
4. Look at [my notes here](#) and add anything you missed. Specifically the examples.
5. Do the “Week 5 Practice Problems” worksheet. You can do this on your own paper or print out this worksheet to complete it on.
 - Take a photo of your work for this assignment and **insert it in the yellow box below**. (don't know how? [Click here](#).)

Insert your work in this box here (don't know how? [Click here](#)):

Week 5: Intro to Quadratics

A **quadratic function** is a function whose largest exponent is 2. For example: $y = x^2$ or $y = -3x^2 + 4$

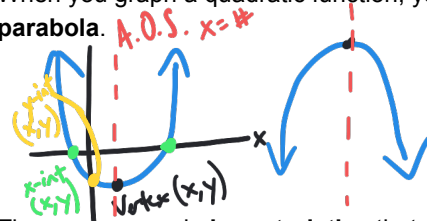
Quadratics can be written in different forms:

Factored Form looks like this: $y = (x - p)(x - q)$ $y = (x - 4)(x + 3)$

Standard Form looks like this: $y = ax^2 + bx + c$ $y = x^2 + 5x - 18$

There are other forms, but we're going to focus on these two forms.

When you graph a quadratic function, you will get a "U" shaped graph (or an upside down "U" shape) called a **parabola**.



There are several **characteristics** that are important to parabolas:

Vertex: highest or lowest point of the graph

Axis of symmetry: invisible vertical line that goes through the vertex and splits the parabola into 2 equal symmetrical halves

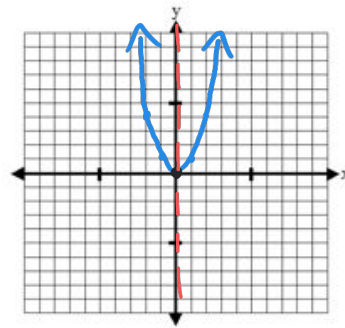
x-intercepts: points where the parabola crosses the x-axis (sometimes whole #s, sometimes not)

y-intercept: point where the parabola crosses the y-axis

Graph the quadratic function and identify the characteristics.

1. $y = x^2$

x	$y = x^2$
-2	$(-2)^2 = 4$
-1	$(-1)^2 = 1$
0	$(0)^2 = 0$
1	$(1)^2 = 1$
2	$(2)^2 = 4$



Vertex: $(0, 0)$

A.O.S. $x = 0$

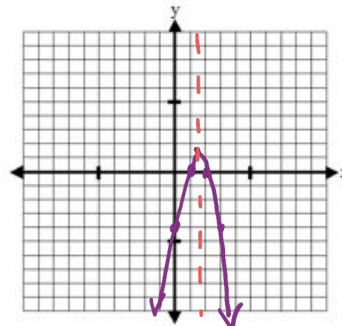
x-intercept(s): $(0, 0)$

y-intercept: $(0, 0)$

2. $y = -2x^2 + 6x - 4$

standard form

x	$y = -2x^2 + 6x - 4$
0	$-2(0)^2 + 6(0) - 4 = -4$
1	$-2(1)^2 + 6(1) - 4 = 0$
1.5	$-2(1.5)^2 + 6(1.5) - 4 = 1.5$
2	$-2(2)^2 + 6(2) - 4 = 0$
3	$-2(3)^2 + 6(3) - 4 = -4$



Vertex: $(1.5, 1.5)$

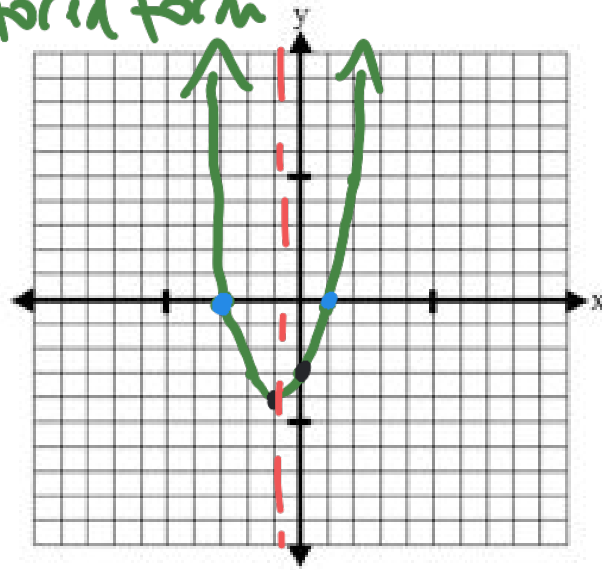
A.O.S. $x = 1.5$

x-intercepts: $(1, 0) + (2, 0)$

y-intercept: $(0, -4)$

3. $y = (x - 1)(x + 3)$ **Factored Form**

x	$y = (x - 1)(x + 3)$
-3	$(-3 - 1)(-3 + 3) = 0$
-2	$(-2 - 1)(-2 + 3) = -3$
-1	$(-1 - 1)(-1 + 3) = -4$
0	$(0 - 1)(0 + 3) = -3$
1	$(1 - 1)(1 + 3) = 0$
2	$(2 - 1)(2 + 3) = 5$



Vertex: $(-1, -4)$

A.O.S. $x = -1$

x-intercepts: $(-3, 0)$ & $(1, 0)$

y-intercept: $(0, -3)$

SUMMARIZE:

1. Information you get about a graph by just looking at the FACTORED form of an equation? (for example $y = (x - 4)(x + 7)$)

the x-intercepts $\{x: (4, 0) \text{ and } (-7, 0)$

2. Information you get about a graph by just looking at the STANDARD form of an equation? (for example $y = x^2 + 3x - 18$)

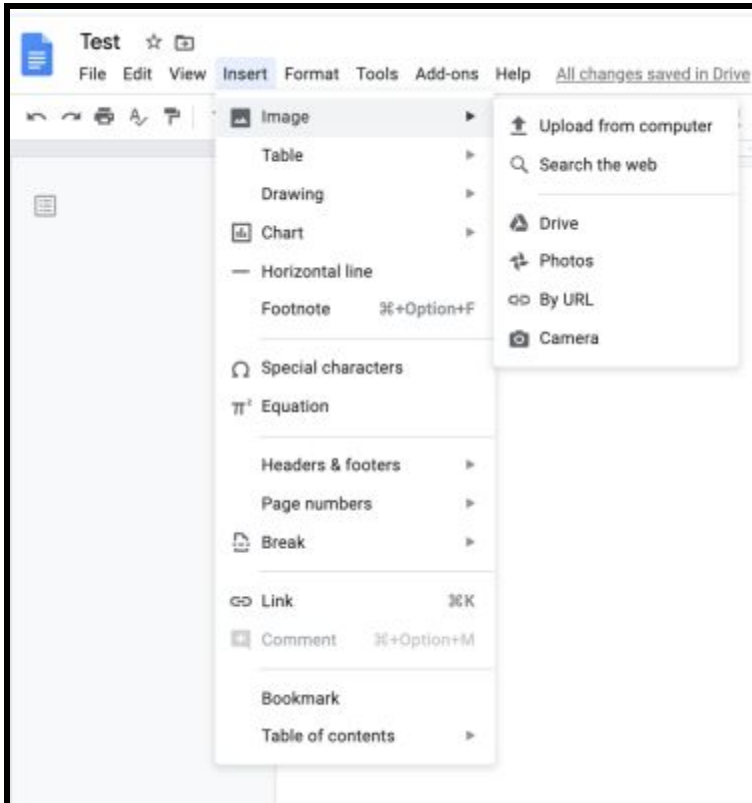
the y-intercept $\{x: y\text{-int}: (0, -18)$

How to insert an image to a Google Doc:

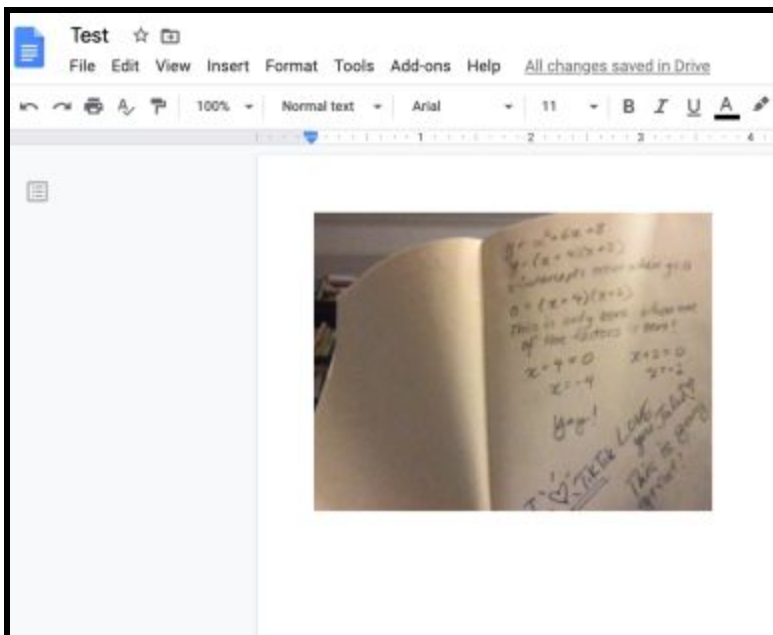
In your Google Doc you can go to INSERT>IMAGE and then choose an image from your computer

OR

In your Google Doc you can go to INSERT > IMAGE > CAMERA



And then you just take a picture of your work using the webcam, and it automatically inserts the picture in the Google Doc. Please then resize it to fit.



Then, you're done!!