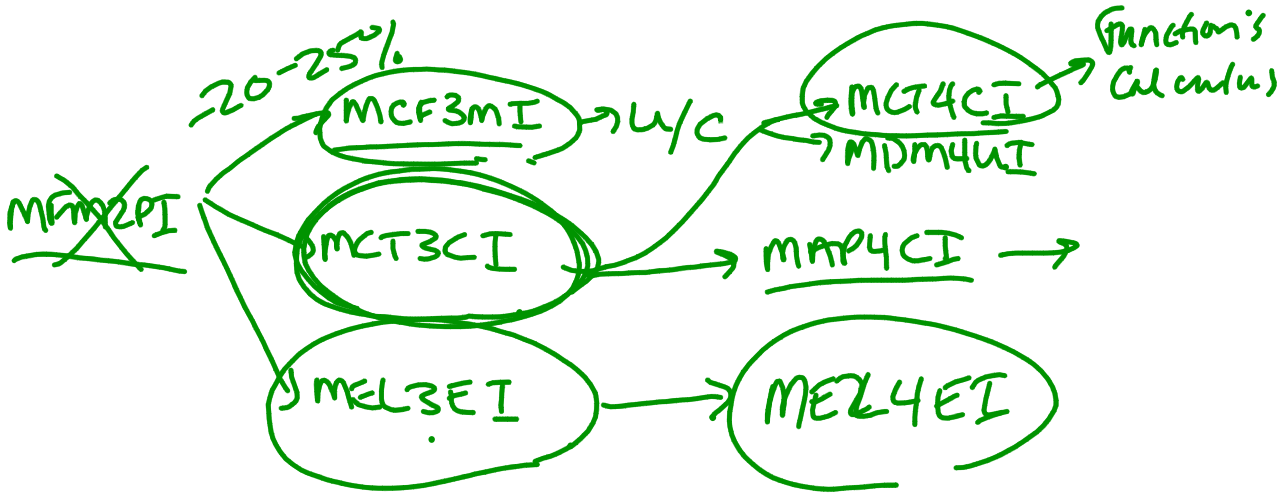
~20-25%
MCF3MI
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Unit 5: Quadratic Relations

Day 2: Model Quadratic Relationships

Today we will....

1. Learn how to identify linear and quadratic relationships from their equation

2. Learn how to use DESMOS to find the equation of a curve of best fit.

What Does a Quadratic Look Like?

The graph of a quadratic function is a symmetric, U-shaped curve called a Parabola.

A quadratic relation can be modelled in equation form in one of three ways:

- $y = ax^2 + bx + c$ STANDARD FORM
- VERTEX FORM → use for Desmos
- $y = a(x - s)(x - t)$ FACTORED FORM

We can expand both Vertex and Factored Forms to get Standard Form.

You can factor Standard Form to get Factored Form.

We will be using Vertex Form in Desmos to find the equation of the curve of best fit.

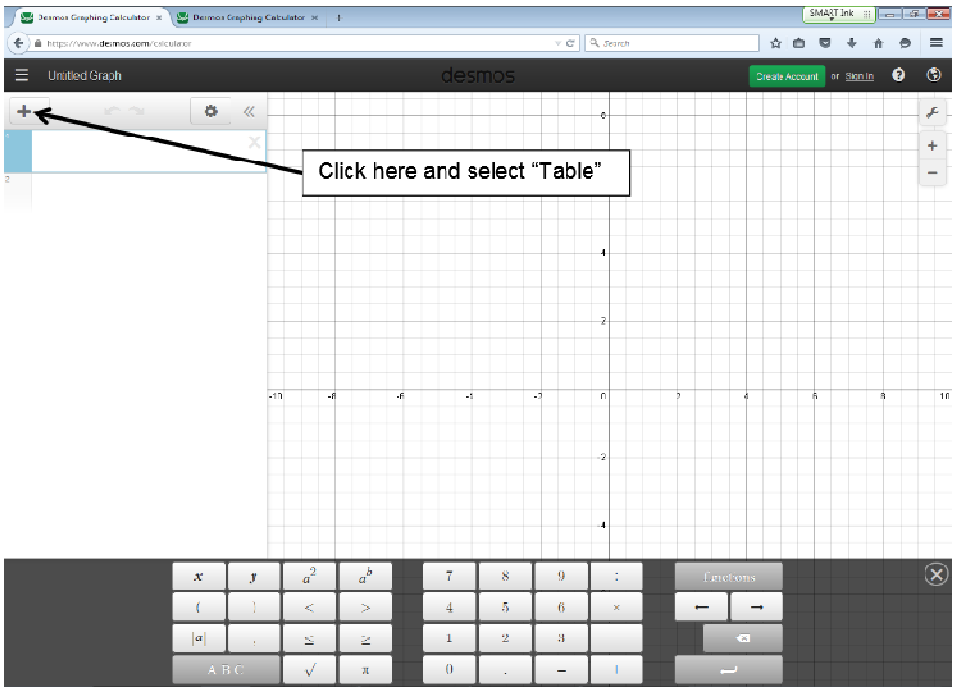
This course does not change Standard Form to Vertex Form (that's for next year!!)

NOTICE:

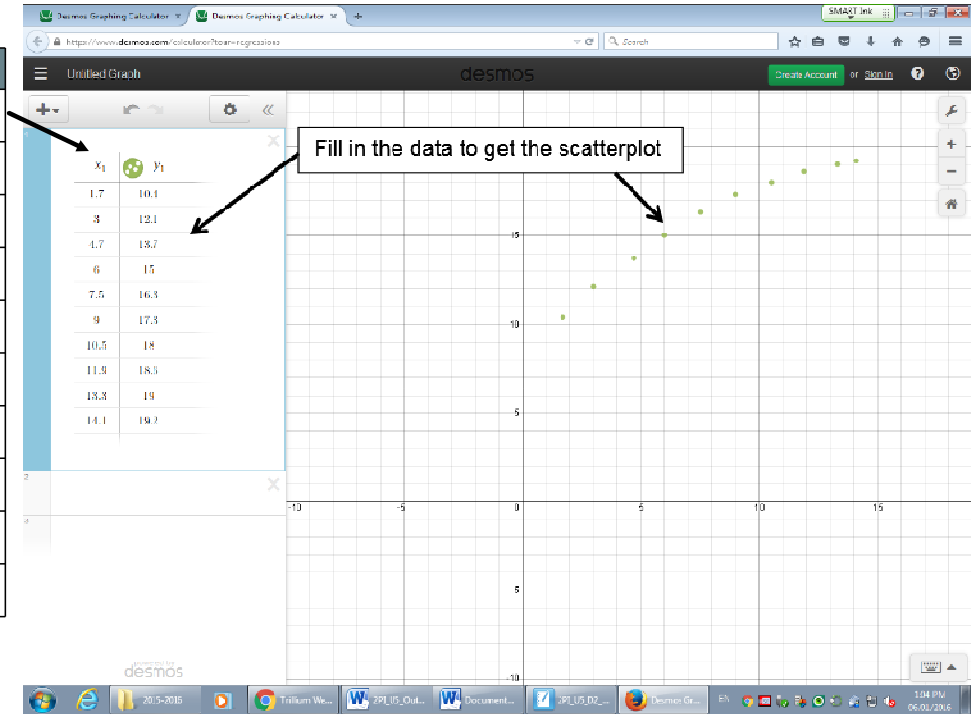
- A quadratic relation ALWAYS has a squared variable!! → in the expanded form
- A linear relation NEVER has a squared variable!! $(y = mx + b)$

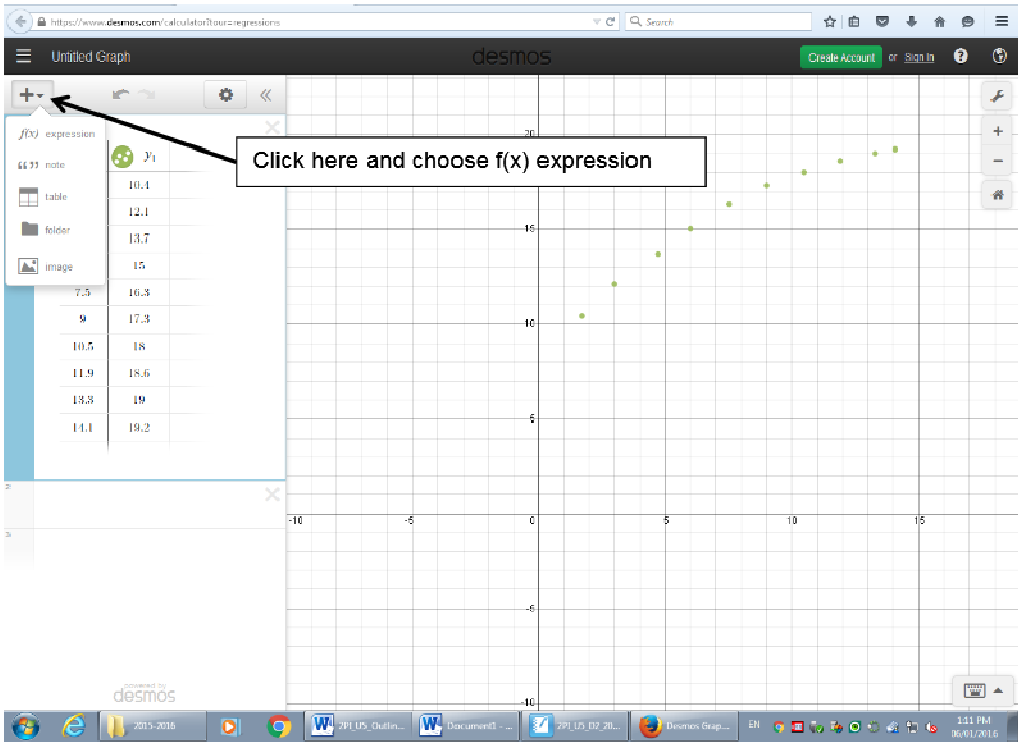
Using DESMOS to find the equation of a quadratic curve of best fit.

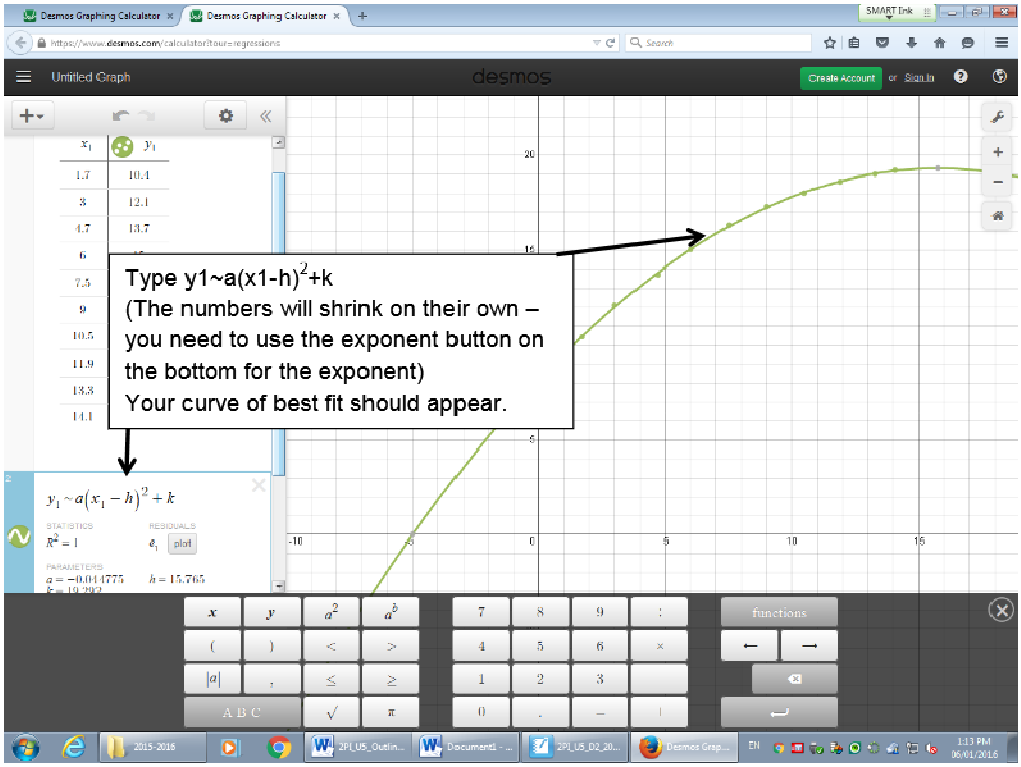
Go to www.desmos.com and Launch Calculator

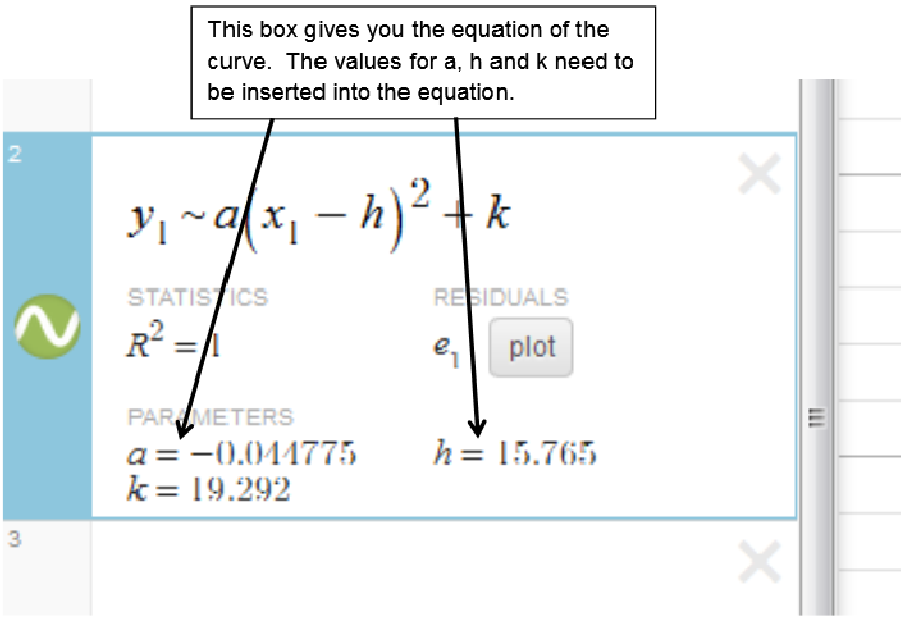


X	Y
1.7	10.4
3	12.1
4.7	13.7
6	15
7.5	16.3
9	17.3
10.5	18
11.9	18.6
13.3	19
14.1	19.2




Untitled Graph
desmos
Create Account
Sign In
Click here and choose f(x) expression


Untitled Graph
desmos
Create Account
Sign In
Type y1~a(x1-h)^2+k
(The numbers will shrink on their own –
you need to use the exponent button on
the bottom for the exponent)
Your curve of best fit should appear.



We can now write the equation.

You should round decimals to two decimal places:

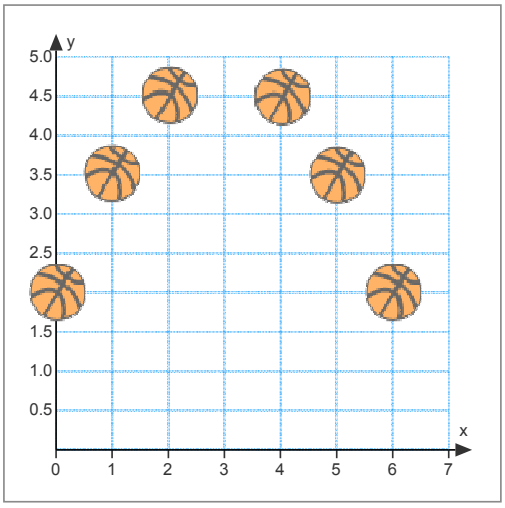
$$y = a(x-h)^2 + k$$

$$y = -0.04(x-15.77)^2 + 19.29$$

Example 2:

The graph shows the path of a basketball shot. The basketball must not touch the gymnasium ceiling, which is 5.5m high. On this shot, will the basketball touch the ceiling?

X	Y
0	2
1	3.5
2	4.5
4	4.5
5	3.5
6	2



Hint: To solve, find each of the scatterplot points and find the curve of best fit in Desmos. Look at the highest point on your curve - is it higher than 5.5m?

The highest point on the parabola is 4.8m so it does not hit the ceiling

Homework:

Section 6.2 Handout

- whenever the homework says to use a graphing calculator, use Desmos!

- leave equations in Vertex form (what Desmos gives you!)