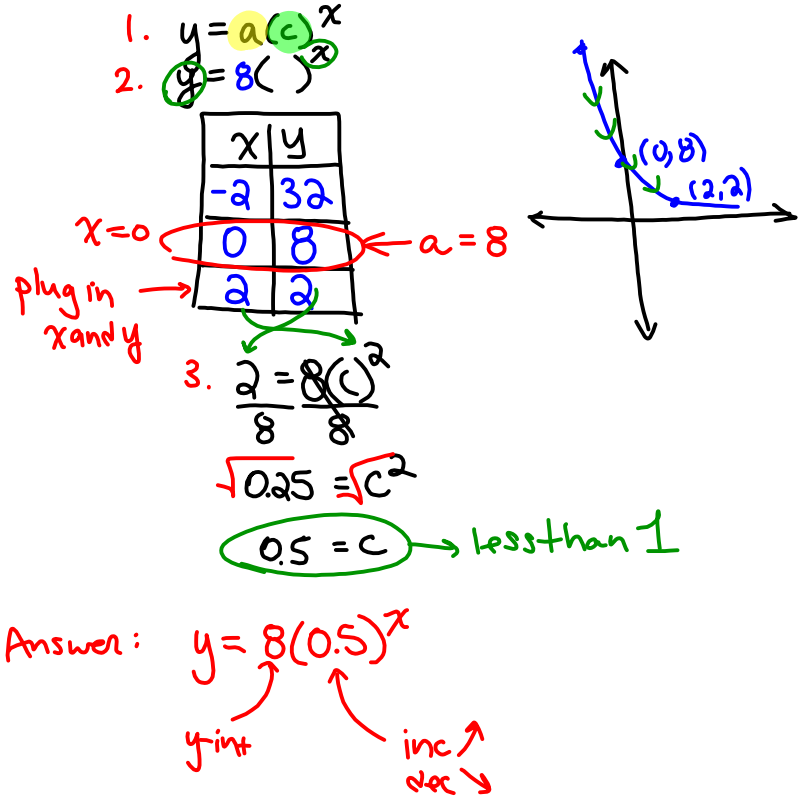
Warmup: Determine the rule of the exponential function



A new function...

We will study a different function by making a table of values and graphing.

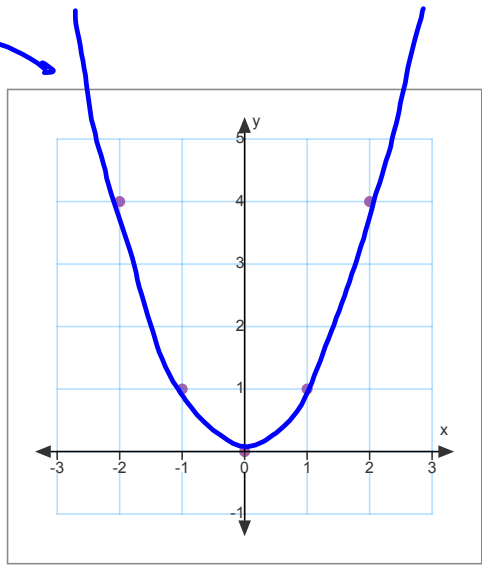
input

$f(x) = x^2$

X	Y
-2	4
-1	1
0	0
1	1
2	4

$f(-2) = (-2)^2 = 4$
$f(-1) = (-1)^2 = 1$
$f(0) = (0)^2 = 0$
$f(1) = (1)^2 = 1$
$f(2) = (2)^2 = 4$

curve is called a "parabola"



The **Quadratic** or **Second-degree polynomial function**

Rule: $f(x) = ax^2$

"a" is a value that affects how wide the parabola is, and whether it is facing up or down

thinner: a is large (bigger than 1)

wider: a is small (decimal)

Formula for finding "a" : $a = \frac{y}{x^2}$

Ex. A parabola passes through the point $(3, 12)$. (x y)

What is the rule?

$\hookrightarrow y = ax^2$

$y = \frac{4}{3}x^2$

$a = \frac{12}{3^2} = \frac{12}{9} = \frac{4}{3}$ or $1.\overline{3}$

Given x,y Find a	Given x,a Find y	Given a,y Find x
$a = \frac{y}{x^2}$	$y = a \cdot x^2$	$x = \sqrt{\frac{y}{a}}$

$\rightarrow y = ax^2$ a - y/x^2

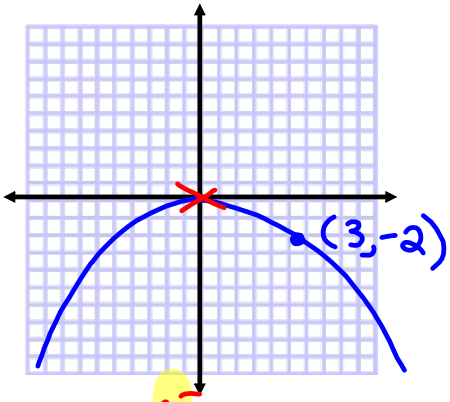
Ex. Determine the rule of the quadratic function

a)

x	y
-2	8
0	0
2	8

$y = 2x^2$

b)



$y = -0.2x^2$

c) f(2) = 1

x y

$y = 0.25x^2$

Given $f(x) = -0.5x^2$

Determine...

a) f(4) $= -0.5(4)^2$ b) f(10) $= -0.5(10)^2$ c) f(-10) $= -0.5(-10)^2$

-8 -50 -50