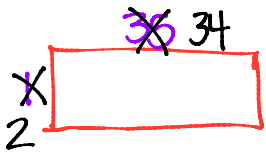
GSE Algebra 1 **6.3 – 6.4 Notes Quadratics** Name: _____

You have a new bunny, Fluffy. You want to build a pen for Fluffy so that she can roam around and not bother you. You bought 72 feet of fencing to build a rectangular pen.

1) Draw a picture of a **rectangular** pen. Then think of some possible dimensions for the perimeter that can add up to 72 feet. You have a table to fill in to help you out.



36
36

18x18 = 324

Length x	Width 36−x	Area A(x)
1	35	35
2	34	68
10	26	260
18	18	324
20	16	

2) With the dimensions that you just filled in, find the area for each play pen for your bunny. Fill in the area part of the chart.
Remember, **length x width is area.

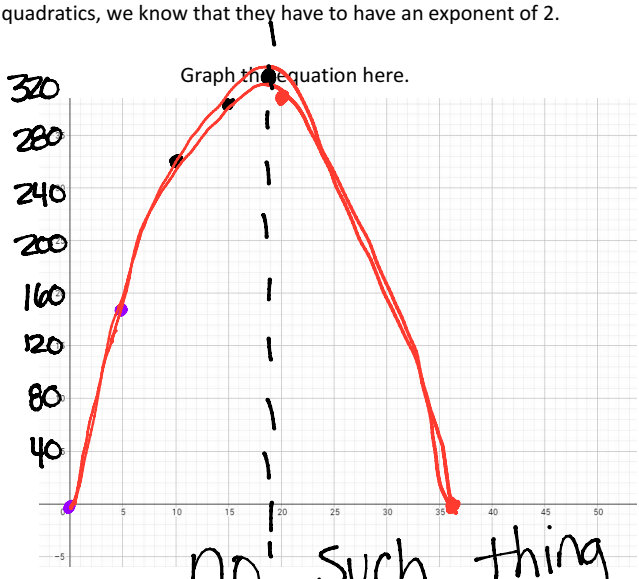
- Which option that you have provided gives you the largest area?

18x18 → SQUARE

$x(36-x) = 36x - x^2 \rightarrow -x^2 + 36x$ std. form

3) Let's think of a model using x that we could create to use to find the area of the pen if we did not know that length or width of the play pen. Think about quadratics, we know that they have to have an exponent of 2.

Graph the equation here.



no such thing as neg. area

Let's list out all the info that we know:

Dom: [0, 36]

Range: [0, 324]

y-int: (0, 0)

x-ints: (0, 0) (36, 0)

Vertex: (18, 324)

Max/min:

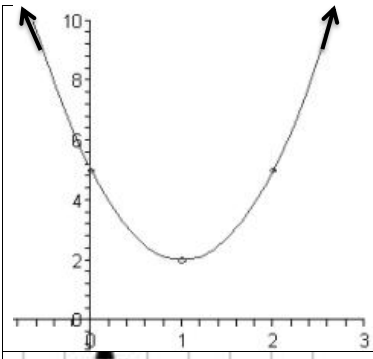
axis of symm: x = 18

Direction: Down

Inc: (0, 18)

Dec: (18, 36)

Let's look at more characteristics of Quadratics.

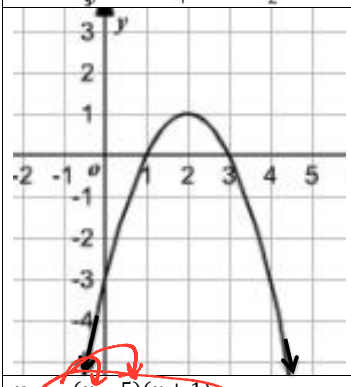


Vertex: (1,2) Axis of symm: x=1 y-int: (0,5)

x-ints: none Dom: (-∞,∞) Range: [2,∞)

Direction: Up Max/Min: min Increasing: (1,∞)

Decreasing: (-∞,1) End Behavior: $x \to -\infty$ $y \to \infty$; $x \to \infty$ $y \to \infty$



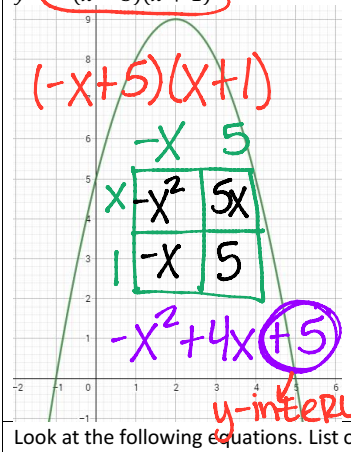
Vertex: (2,1) Axis of symm: x=2 y-int: (0,-3)

x-ints: (1,0)(3,0) Dom: (-∞,∞) Range: (-∞,1] Low to hi

Direction: Down Max/Min: Increasing: (-∞,2)

Decreasing: (2,∞) End Behavior: $x \to -\infty$ $y \to -\infty$; $x \to \infty$ $y \to -\infty$

$y = -(x-5)(x+1)$



(-x+5)(x+1)

	-x	5
x	$-x^2$	5x
1	-x	5

$-x^2+4x+5$ y-intercept

Vertex: (2,9) Axis of symm: x=2 y-int: (0,5)

x-ints: (-1,0) (5,0) Dom: (-∞,∞) Range: (-∞,9]

Direction: down Max/Min: Increasing: (-∞,2)

Decreasing: (2,∞) End Behavior: $x \to -\infty$ $y \to -\infty$; $x \to \infty$ $y \to -\infty$

Put the above equation in standard form.

Look at the following equations. List out what you know based just on the equations.

a. $y = (x-3)(x-7)$ b. $y = 2(x+2)(x-6)$ c. $y = \frac{1}{2}x(x+4)$

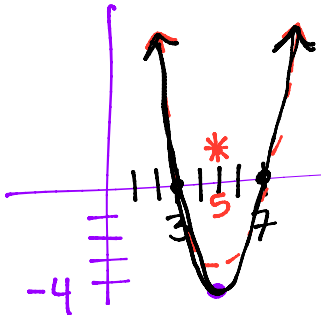
Interrupt form

x-3=0 x-7=0

+3 +3 +7 +7

x-int

x=3 x=7



(5-3)(5-7)=-4

Vertex: (5,-4)

Min

Axis of symm

x=5

y-int

(0-3)(0-7)

(0,21)

b) $y = 2(x+2)(x-6)$

$(2x+4)(x-6) = 0$

$2x+4=0$ $\quad -4 \quad -4$

$\frac{2x}{2} = \frac{-4}{2}$

$x = -2$

$x-6=0$ $\quad +6 \quad +6$

$x = 6$

$2(2+2)(2-6)$

$= -32$

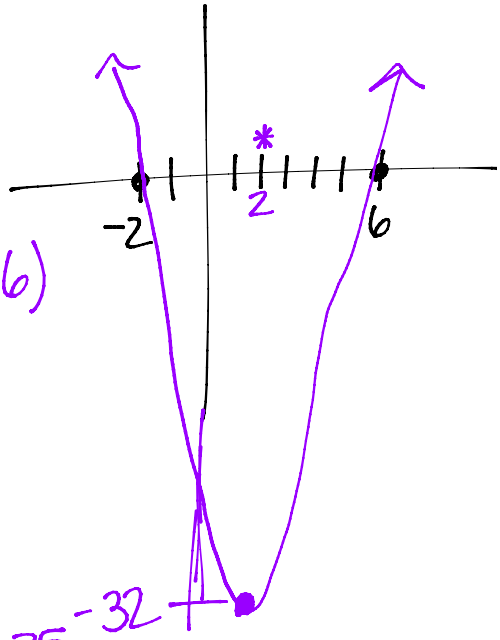
Vertex

$(2, -32)$

Min

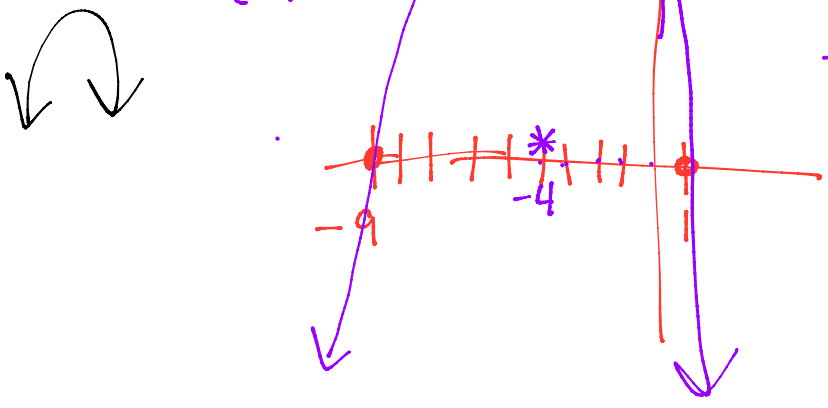
axis of symm

$x = 2$



$y = -(x-1)(x+9)$

$-(-4-1)(-4+9) = 25$



$\frac{1+-9}{2} = \frac{-8}{2} = -4$