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.

35
34
2X
36
36

X(36-X)

Length x	Width 36-x	Area A(x)
1	35	35
2	34	68
3	33	99
4	32	128
5	31	155
6	30	180
7	29	203
8	28	224
9	27	243
10	26	260
11	25	275
12	24	288
13	23	299
14	22	308
15	21	315
16	20	320
17	19	323
18	18	324
19	17	323

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?

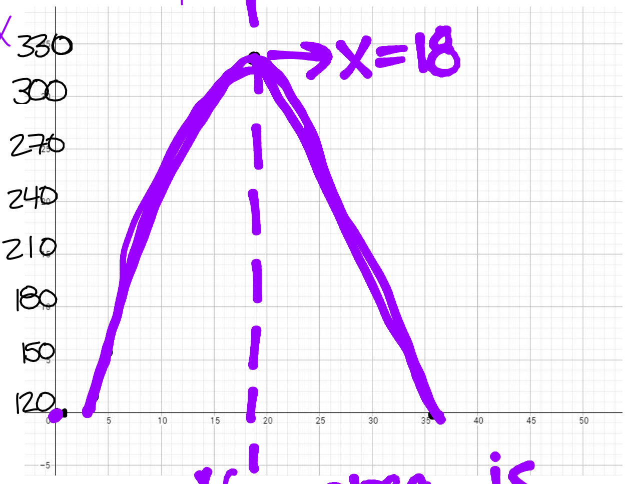
SQUARE 18 by 18

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

X(36-X)

$36X - X^2 \rightarrow -X^2 + 36X$

Graph the equation here.



Neg area is not a thing

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: Max

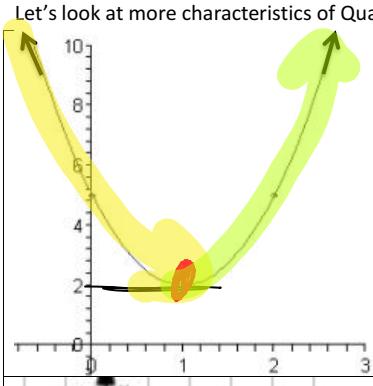
axis of symm: X=18

Direction: Down

Inc: (0,18)

Dec: (18,36)

Let's look at more characteristics of Quadratics.

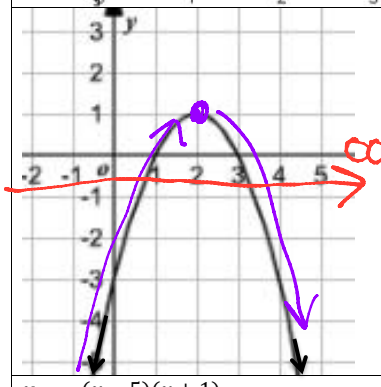


Vertex: (1,2) Axis of symm: X=1 y-int: (0,5)

x-ints: none Dom: $(-\infty,\infty)$ Range: $[2,\infty)$

Direction: UP Max/Min: Increasing: $(1,\infty)$

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



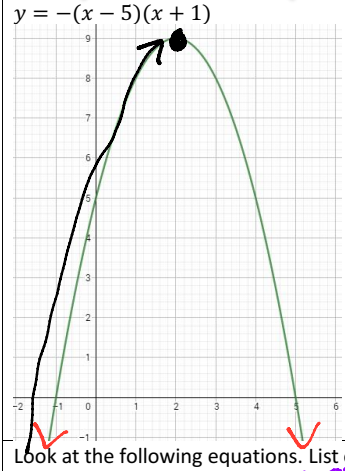
Vertex: (2,1) Axis of symm: X=2 y-int: (0,-3)

x-ints: (1,0) (3,0) Dom: $(-\infty,\infty)$ Range: $(-\infty,1]$

Direction: Down Max/Min: Increasing: $(-\infty,2)$

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

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



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

x-ints: (-1,0) (5,0) Dom: $(-\infty,\infty)$ Range: $(-\infty,9]$

Direction: Down Max/Min: Increasing: $(-\infty,2)$

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

Put the above equation in standard form. $-(x-5)(x+1)$ Intercept

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

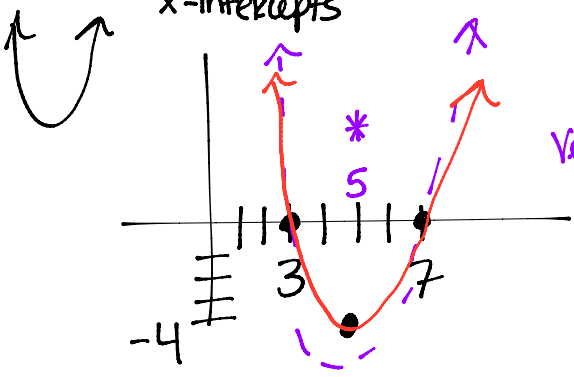
a. $y = (x-3)(x-7)$ Intercept b. $y = 2(x+2)(x-6)$ c. $y = \frac{1}{2}x(x+4)$

$(x-3)(x-7)=0$

$x-3=0$ $x-7=0$

$+3\ +3$ $+7\ +7$

$x=3$ $x=7$ x-intercepts



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

$-x^2+4x+5$

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

y-intercept

standard form

Vertex $(5,-4)$

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

$(0-3)(0-7)=21$

y-int