1. Get the Solutions
2. Check your work ← with a pen
3. Turn in your assignment and Pick up the Warm Up.

skip #3

HW Questions

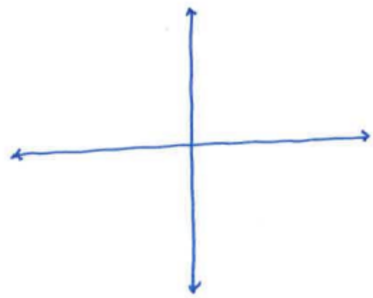
Assignment 2.1.4 Day 2

Name ______________________

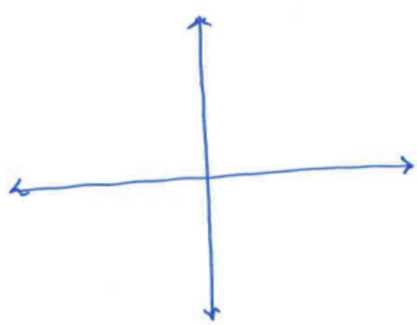
Per. ___

① Complete the square to convert to graphing form. Then make a sketch. Include labels for the vertex and y-intercept.

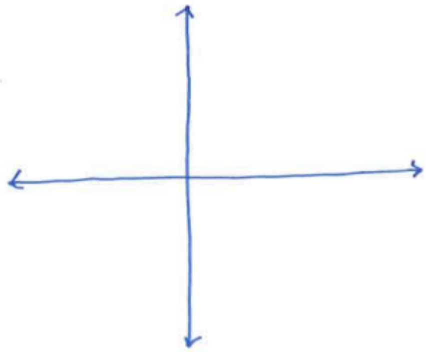
a) $y = x^2 - 4x + 9$



b) $y = x^2 + 7x - 2$

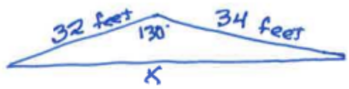


c) $y = 2x^2 - 16x + 30$ (Hint: The "a" coefficient must be 1)



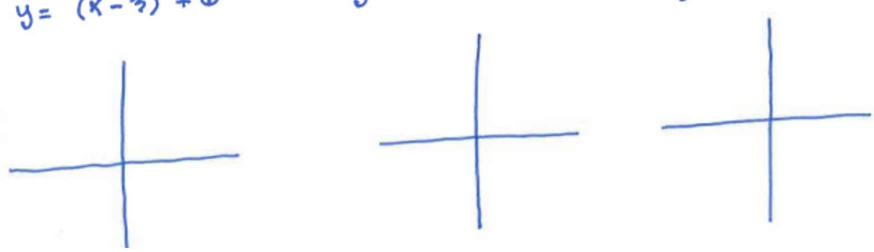
② Find the distance between $(-7, 20)$ and $(3, -5)$ to the nearest 2 decimal places

(3) Find x



(4) Sketch the functions withOUT a calculator ... skills

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



5 Find the x-intercepts; algebraically

$y = (x-3)^2 - 1$

Warm Up

1. Complete the square to convert $y = 4x^2 + 8x + 7$ to graphing form. Careful since $a \neq 1$. If you were absent last class, get someone to show you their notes or, better yet, have them explain what to do.

$y = 4x^2 + 8x + 7$

divide by 4

$$\frac{y}{4} = x^2 + 2x + \frac{7}{4}$$

CONVERT TO A picture

$$\frac{y}{4} + 1 = \begin{array}{c|c|c} & x & 1 \\ \hline x & x^2 & x \\ \hline 1 & x & 1 \end{array} + \frac{7}{4}$$

CONVERT back to an equation

$$4\cdot\frac{y}{4} + 4\cdot 1 = 4(x+1)^2 + 4\cdot\frac{7}{4}$$

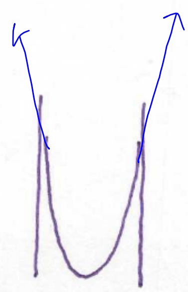
$$y + 4 = 4(x+1)^2 + 7$$
$$-4 \qquad\qquad -4$$

$$y = 4(x+1)^2 + 3$$

2. Think about sketching parabolas.

a) Do the sides of a parabola ever curve back like  ?

x^2

b) Do the sides of a parabola approach straight vertical lines? In other words, do parabolas have asymptote.  ?

3. Find the x-intercept(s) of the parabola $y = 2x^2 + 5x - 12$ (algebraically)

$$0 = 2x^2 + 5x - 12$$

$a = 1$

$b = 5$

$c = -12$

$$x = \frac{-(5) \pm \sqrt{(5)^2 - 4(1)(-12)}}{2(1)}$$

$$x = \frac{-5 \pm \sqrt{73}}{2}$$

4. Remember that exponential functions look like $y = ab^x$
Use the double substitution method to find the exponential function that passes through the two points $(-1, 40)$ and $(1, 3.6)$

b^{-1}

$40 = ab^{-1}$ $3.6 = ab^1$

multiply by b $40 = \frac{a}{b^1}$

$a = 40b$

$3.6 = ab^1$

$3.6 = (40b)b$

$3.6 = 40b^2$

$b^2 = \frac{3.6}{40}$

$\sqrt{}$ $\sqrt{\frac{3.6}{40}}$

$b = 0.3$

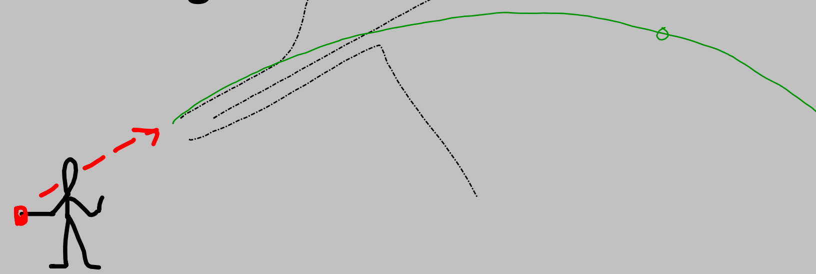
$3.6 = a(.3)$

$a = \frac{3.6}{.3} = 12$

$y = 12(0.3)^x$

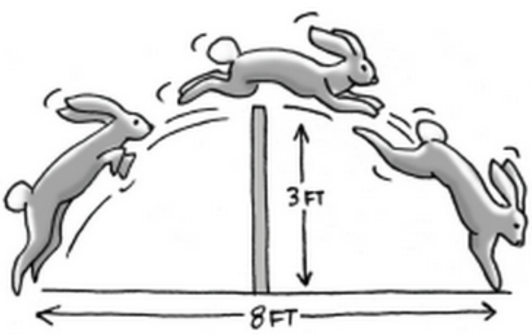
AIM

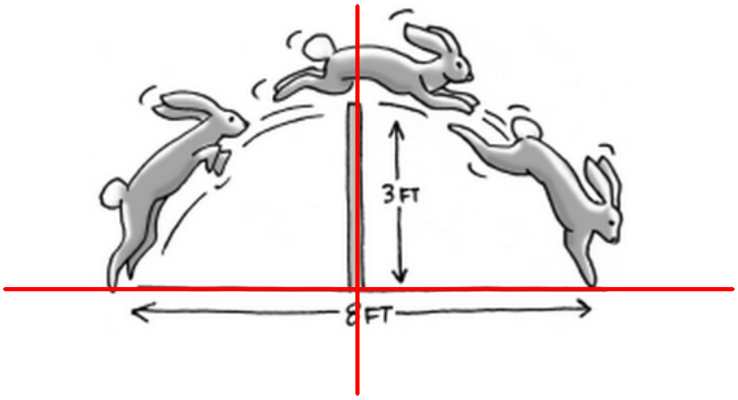
Perform Mathematical Modeling with Parabolas

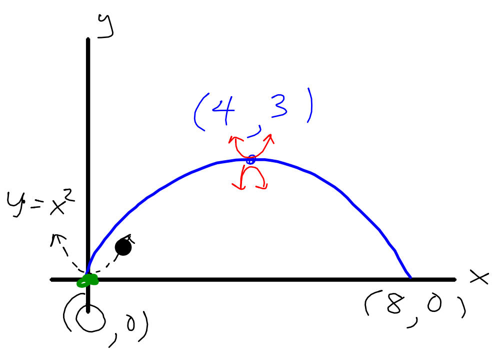


$y = x^2$

Jumping Rabbits





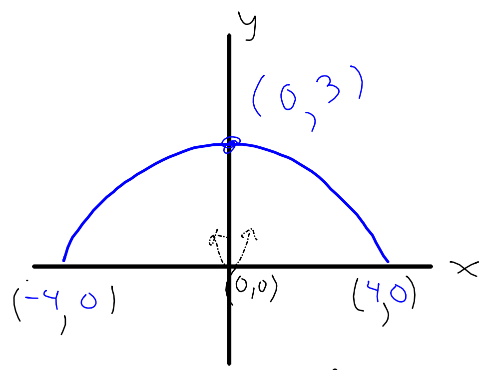


Start $y = x^2$

$y = a(x-4)^2 + 3$

Substitute a point that is NOT the vertex

I'll use (8, 0)



Start $y = x^2$

$y = a(x)^2 + 3$

I'll use $\underset{x\ \ y}{(4, 0)}$

$$0 = a(8-4)^2 + 3$$
$$0 = a(4)^2 + 3$$
$$0 = 16a + 3$$
$$-3 \qquad -3$$
$$-3 = 16a$$
$$\overline{16} \qquad \overline{16}$$
$$a = -\frac{3}{16}$$
$$y = -\frac{3}{16}(x-4)^2 + 3$$

$$0 = a(4)^2 + 3$$
$$0 = 16a + 3$$
$$-3 \qquad -3$$
$$-3 = 16a$$
$$\overline{16} \qquad \overline{16}$$
$$a = -\frac{3}{16}$$
$$y = -\frac{3}{16}x^2 + 3$$

Standard form: $y = ax^2 + bx + c$

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

Factored form: $y = a(x + b)(x + c)$.

-

$y = a(x-4)^2 + 3$

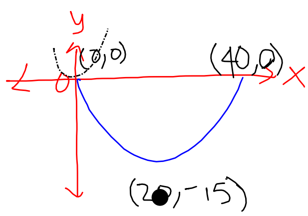
$y = a(x - h)^2 + k$

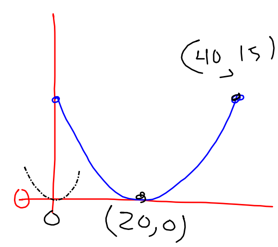
$y = a(x - h)^2 + k$

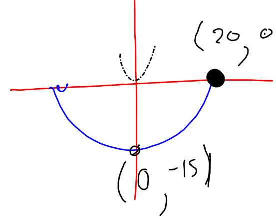
Next....

2-67

core problem







$y = ax^2$

$y = a(x-20)^2 - 15$

$0 = a(40-20)^2 - 15$

$a = \frac{3}{80}$

$y = a(x)^2$

$y = a(x-20)^2$

$15 = a(40-20)^2$

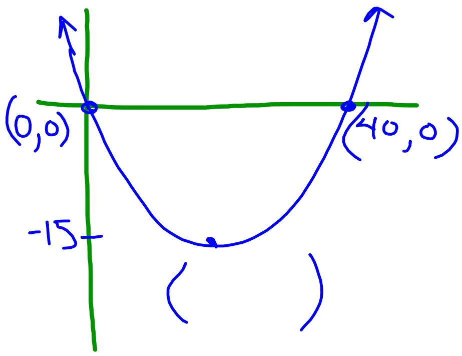
$y = ax^2$

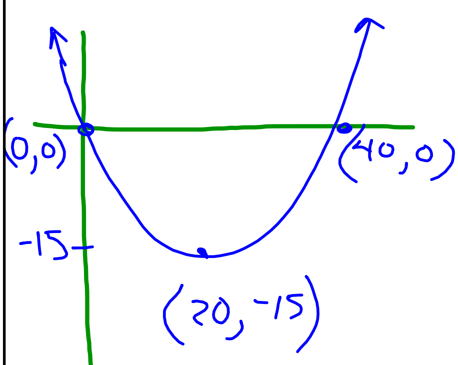
$y = a(x)^2 - 15$

$0 = a(20)^2 - 15$

$a = \frac{15}{400}$

At the skateboard park, the hot new attraction is the *U-Dip,* a cement structure embedded into the ground. The cross-sectional view of the *U-Dip* is a parabola that dips 15 feet below the ground. The width at ground level, its widest part, is 40 feet across. Sketch the cross-sectional view of the *U-Dip*, and find an equation of the parabola that models it.





Model:

$$y = a(x-20)^2 - 15$$

$$0 = a(40-20)^2 - 15$$

$$0 = a \cdot 400 - 15$$

$$15 = 400a$$

$$a = \frac{15}{400} = \frac{3}{80} \quad .0375$$

B.B.

●

Group
LCQ

Calculator and
Notes ok

Assignment

2- 66, 72a, 73, 74

$\sqrt{3}\cdot\sqrt{3}$

$\sqrt{3}+\sqrt{3}$

$\sqrt{24}$

$\sqrt{\frac{7}{16}}$

$\frac{\sqrt{250}}{\sqrt{10}}$