Pick Up the Warm Up

Do not use a Calculator
(except for to check your answers)

HW Help Hotline

Shifts to the right 2 units and down 5 units. $y = (x-2)^2 - 5$

Shifts to the left 3 units and up 1 unit. $y = (x+3)^2 + 1$

Shifts down 4 units. $y = x^2 - 4$

Shifts right 10.9 units. $y = (x-10.9)^2$

Stretched vertically by a factor of 2.5 and shifted 9.8 units left and 8 units down.

$y = 2.5(x+9.8)^2 - 8$

Compressed vertically by a factor of 0.4 and shifted 7.3 units to the right.

$y = 0.4(x-7.3)^2$

$\sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3$

$\sqrt{3} + \sqrt{3} = 2\sqrt{3}$

$\sqrt{dog} \cdot \sqrt{dog} =$

in^2

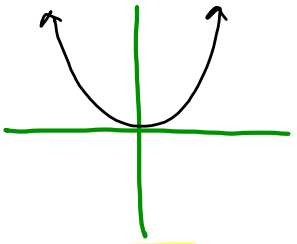
$\sqrt{24} = \sqrt{4}\sqrt{6} = 2\sqrt{6}$

$2\sqrt{6}$

$\sqrt{\frac{7}{16}} = \frac{\sqrt{7}}{\sqrt{16}} = \frac{\sqrt{7}}{4}$ or $\frac{1}{4}\sqrt{7}$

$\frac{\sqrt{250}}{\sqrt{10}} = \sqrt{\frac{250}{10}} = \sqrt{25} = 5$

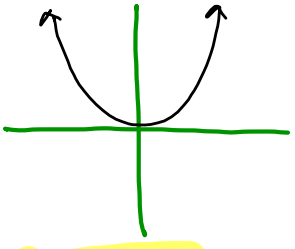
Example of a Parent Graph



$y = x^2$

for a quadratic function

Example of a Parent Graph



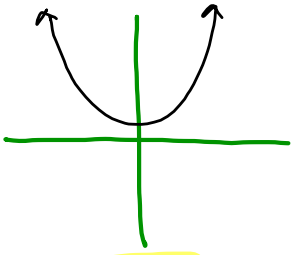
$y = x^2$

for a quadratic function

MAKE Transformations

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

Example of a Parent Graph

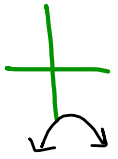


$y = x^2$

for a quadratic function

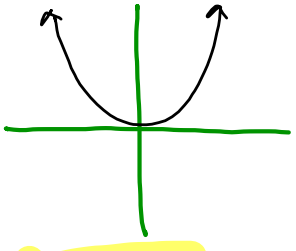
Make Transformations

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



$y = -\frac{1}{2}(x+3)^2 - 7$

Example of a Parent Graph

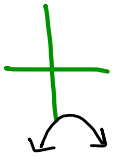


$y = x^2$

for a quadratic function

Make Transformations

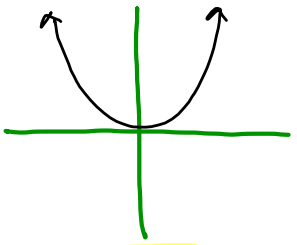
$y = a(x-h)^2 + k$



$y = -\frac{1}{2}(x+3)^2 - 7$

$y = (x+4)^2$

Example of a Parent Graph

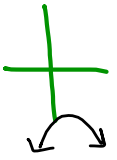


$y = x^2$

for a quadratic function

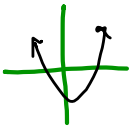
MAKE Transformations

$y = a(x-h)^2 + k$ ← general equation



$y = -\frac{1}{2}(x+3)^2 - 7$

$y = (x+4)^2$



$y = 1.1(x-4)^2 - 5$

Next Few Lessons
(2.2)

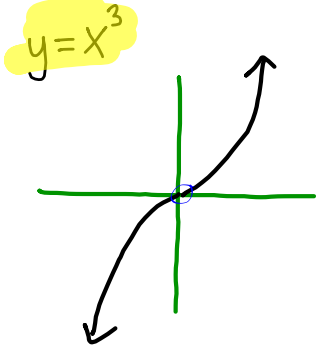
New parent function → Transform

GOAL: Transform any function using same techniques

$y = x^3$

You'll experiment with Transforming $y = x^3$

QUICK Sketch

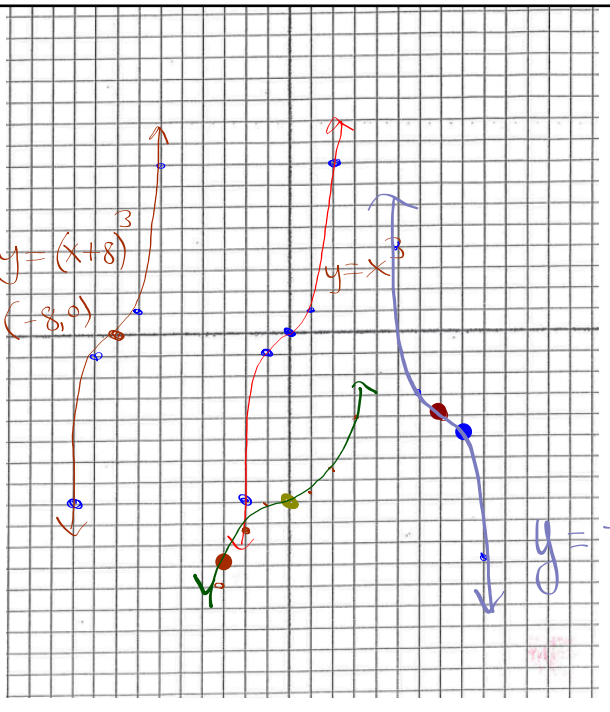


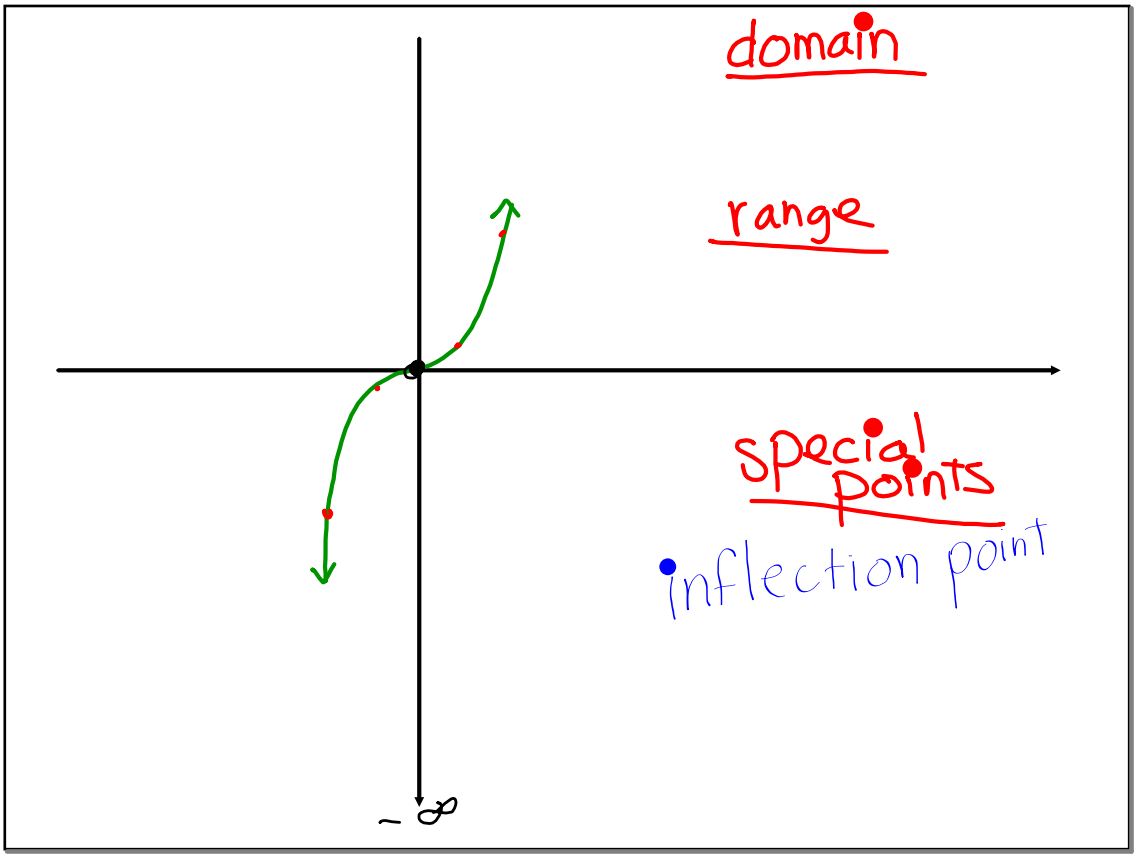
- On a large piece of graph paper (in your notes)
- Keep each square at 1 unit

a) Graph $y = x^3$

b) With your group discuss and write down the domain and range.

c) Label any special points or asymptotes (if any).



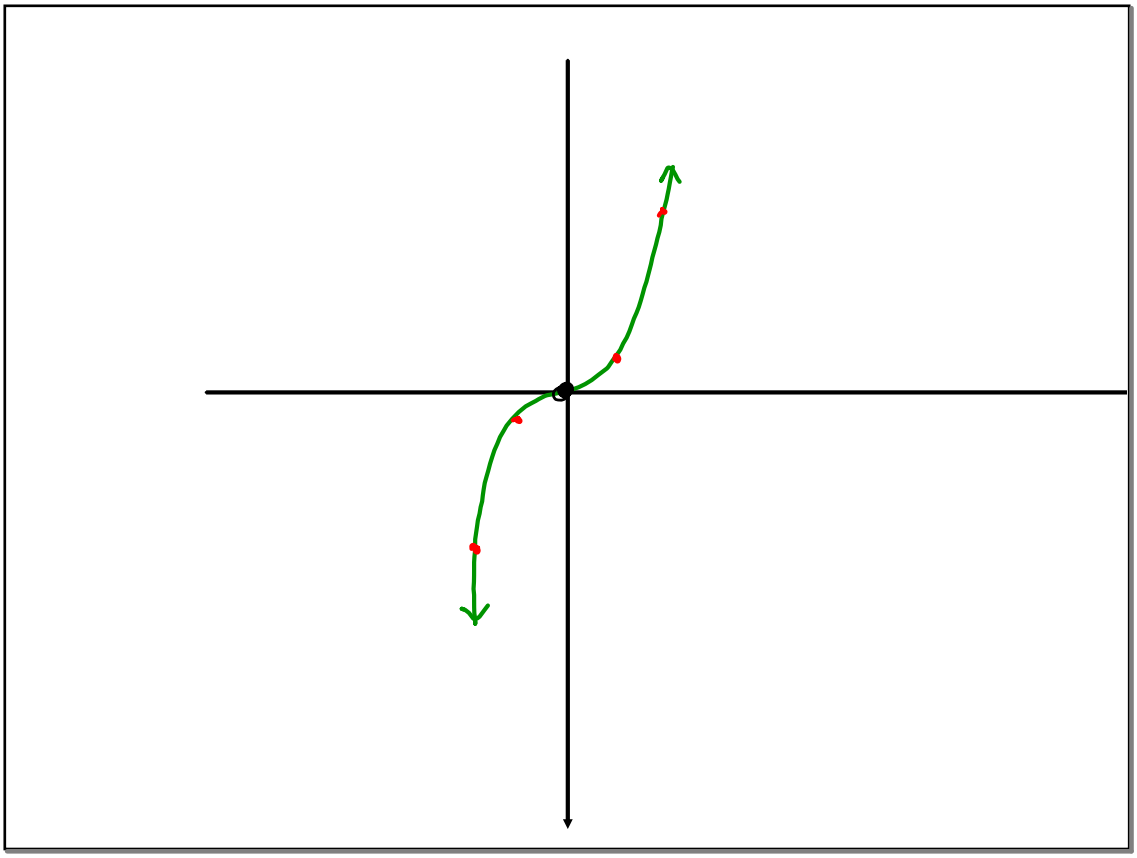


Can make one darker

- $Y_1 =$ ← experimental function
- $Y_2 = x^3$

a) Find and graph an equation that will shift (translate) $y = x^3$ 8 units left. (label the equation next to its graph.

What are the coordinates of the special point (,)



(b) Shift $y = x^3$ down 8 units and vertically shrink by a factor of 0.2

- Graph with a dotted line
- label the equation

$y = 0.2(x)^3 - 8$

$y = .2x^3 - 8$

(c) Find and graph of a transformation that is translated 7 units right, down 4, and with a negative orientation

(d) Transform $y = x^3$ so it flips upside down

(but you <u>don't</u> need to graph it.

Check your homework

2-61 Leadfoot Lettie 80 mph 1 mi 65 mph

a) how long for 50 miles

$d = rt$

$50 = 80 \cdot t$

$t = \frac{50}{80} = .625$ hours

$\times 60$ 37.5 min

(b) 50 miles at speed limit

$d = rt$ $\quad 50 = 65 \cdot t$

$\{$

.77 hours

46.14 min

46.14
3150

(c) Speeding ticket $200

What would be her cost per minute of the time saved by speeding?

.77 hours − .625 hours = .145 hours

$\approx$ 8.7 min

So $\frac{\$200}{8.7}$

$\approx \$22.99$ / min

2-50 (b) $y = x^2 - 4x + 9$

$y =$

x^2	$-2x$
$-2x$	

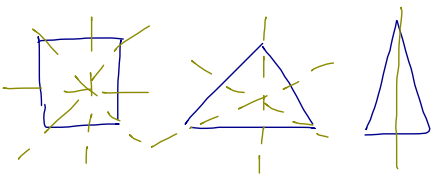
$+9$

(d) $y = x^2 + 7x - 2$

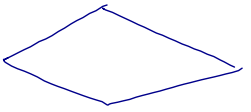
$y =$

x^2	$\frac{7}{2}x$
$\frac{7}{2}x$	

2-59 a) figures with lines of symmetry



b) with 2 lines of Sym

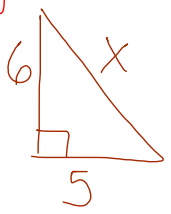


c) infinite ?

2-60 $y = 3x - 1$ $2y + 5x = 53$

2-62

(a)

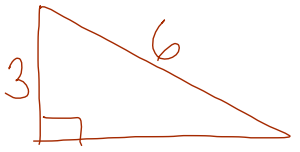


$x^2 = 5^2 + 6^2$

$x = \sqrt{25+36}$

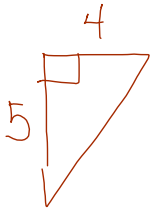
$x = \sqrt{61}$

(b) $m\angle C =$



C

(c)



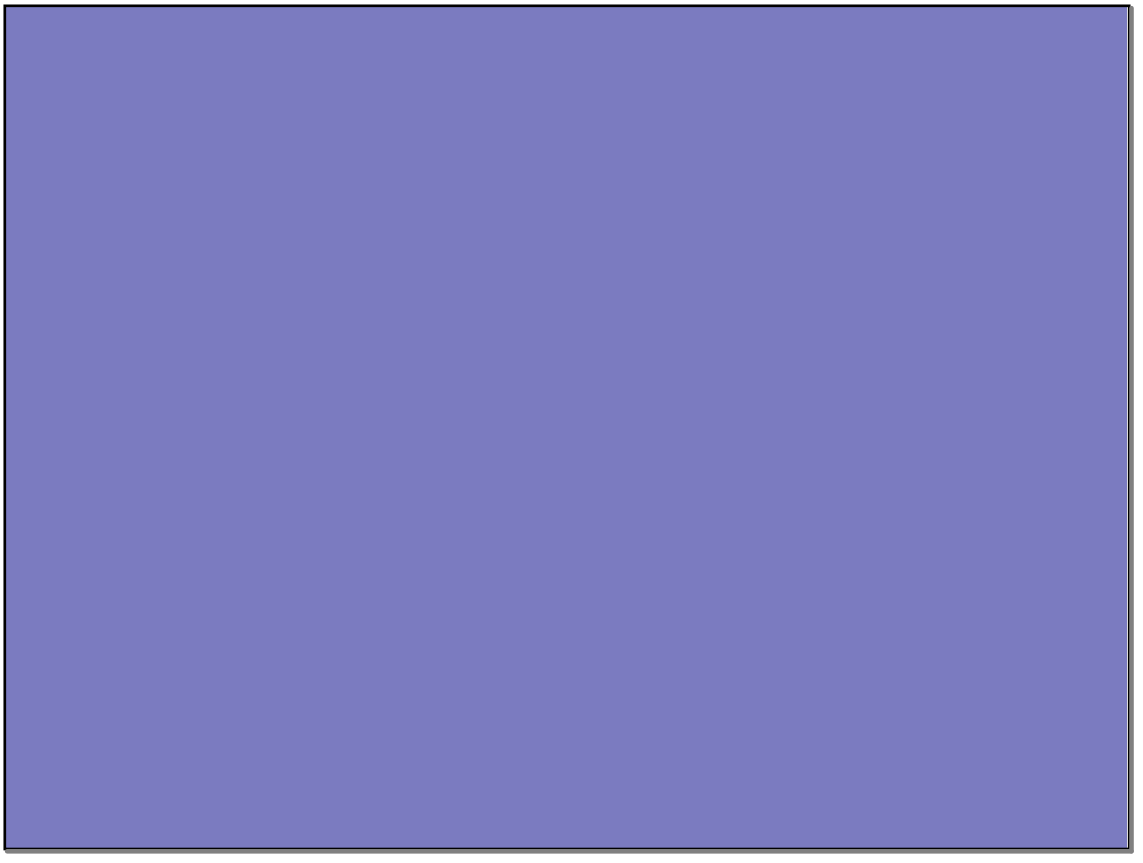
(d)

Soh-Cah-Toa

2-63

(a) house purchased for $120,000 annual appreciation 6%

(b) bacteria 180 22% per hour



On the road to becoming.....

proficient with transforming parabolas

proficient at writing functions of parabolas in both standard form and graphing form

Target:

Create a parabolic function that matches a situation.

Target:

Create a parabolic function that ~~matches~~ Models a situation.

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

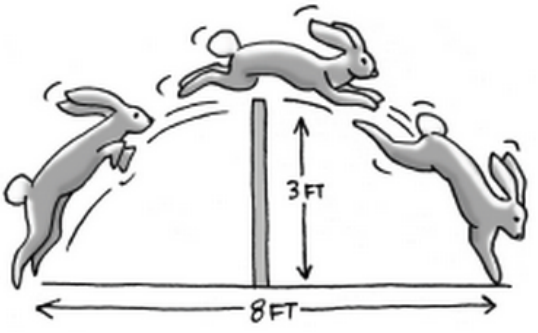
Graphing form: $y = a(x - h)^2 + k$

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

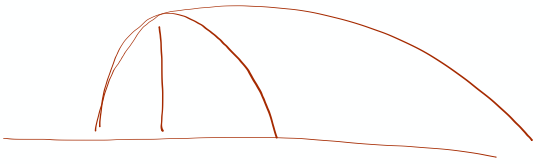
AIM #1

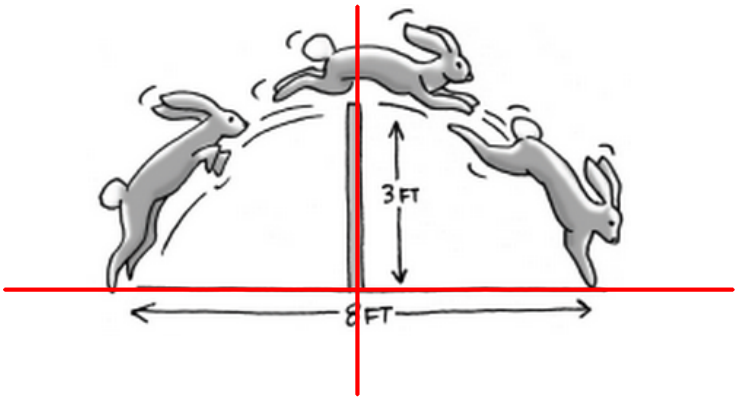
Perform Mathematical Modeling with Parabolas

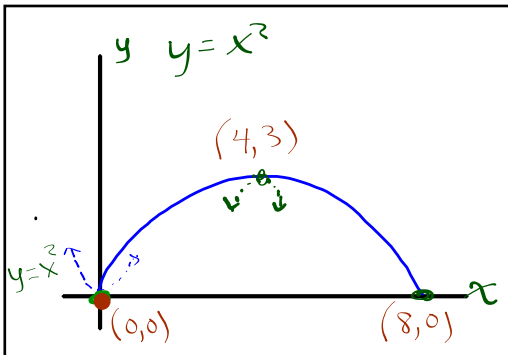
Title



read 2-64 p. 79




3 FT
8 FT



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

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

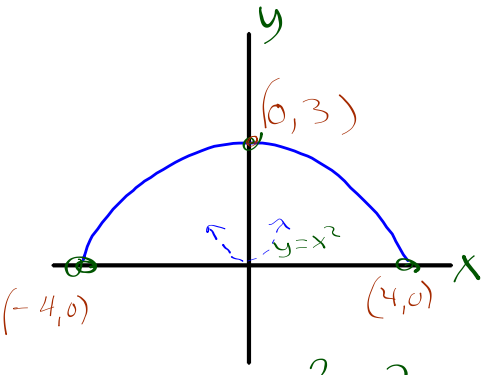
Use (8,0)

$0 = -a(8-4)^2 + 3$

$0 = -16a + 3$

$a = \frac{3}{16}$

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



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

$y = -ax^2 + 3$

$0 = -a(4)^2 + 3$

$0 = -16a + 3$

$-3 = -16a$

$a = \frac{3}{16}$

$y = -\frac{3}{16}x^2 + 3$

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

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

Move on to

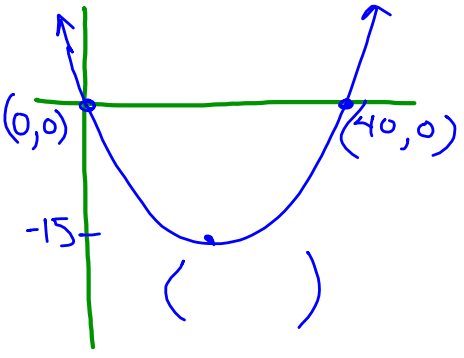
2-66

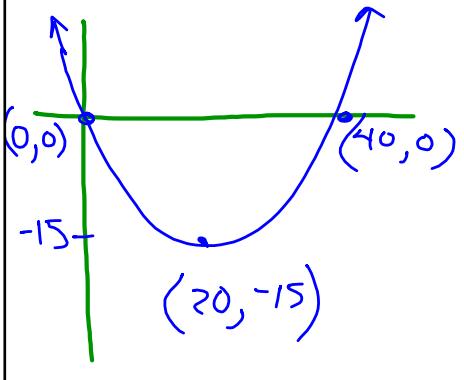
When Ms. Bibbi kicked a soccer ball, it traveled a horizontal distance of 150 feet and reached a height of 100 feet at its highest point. Sketch the path of the soccer ball and find an equation of the parabola that models it.

Next....

2-67

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.

Mid Chapter Check

- See your LCQ

Assignment

2- 69-71, 72a, 73-74, 75a, 91

graph paper needed for #70