<u>Pick Up the Warm Up</u>

•

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

HW Help

Hotline

Next Test (ch.2)
Thur, JaN 31
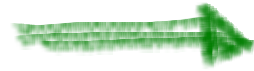
Shifts to the right 2 units and down 5 units. $y = (x-2)^2 - 5$

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.

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

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

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

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

$$\sqrt{\frac{7}{16}} = \frac{\sqrt{7}}{\sqrt{16}} = \boxed{\frac{\sqrt{7}}{4}} \qquad \sqrt{23} \qquad\qquad \begin{array}{l} 4 \\ 9 \\ 16 \\ 25 \end{array}$$

$$\frac{\sqrt{250}}{\sqrt{10}} = \sqrt{\frac{250}{10}} = \sqrt{\frac{25}{1}} = \sqrt{25} = \boxed{5}$$

Questions on homework

The following students
should check your
HW in the hall
because I will be
returning the
Quiz on Sequences & Exp functions

P. 3
Lainey
Jackson
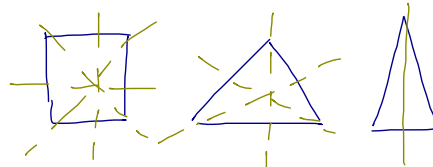Gunner

p. 4
Kaylieigh
Jolene
Dakota
Daphne
Hannah W

2-50 (b)

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

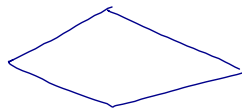$$y = \boxed{\begin{array}{|c|c|} \hline x^2 & -2x \\ \hline -2x & \\ \hline \end{array}} + 9$$

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

2-61   Leadfoot Letfie   80 mph   limit 65mph

a) how long for 50 miles

$$d = r \, t$$

$$50 = 80 \cdot t$$

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

$$37.5 \text{ min}$$

(b) 50 miles at speed limit

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

$\{$

.77 hours

46 $\cdot$ 14 min

(c) Speeding ticket $200

What would be her cost per minute of the time saved by speeding?
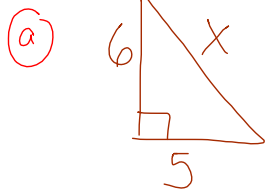
.77 hours — .625 hours = .145 hours

$\approx$ 8.7 min

So $\dfrac{\$200}{8.7}$

$\approx$ $22.99 / min

$2-6^2$

(a)

6   x

5

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

$x = \sqrt{25 + 36}$

$x = \sqrt{61}$

(b) $m\angle C =$

3   6

C

(c)

4

5

(d)   Soh-Cah-Toa

adjacent

a

hypot   30

10
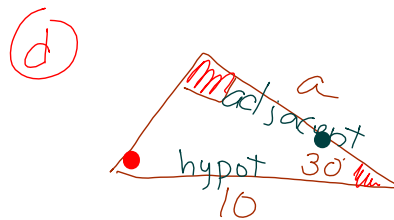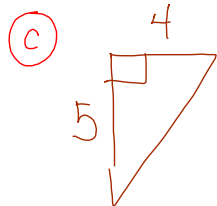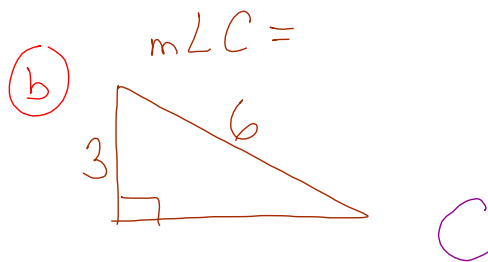
2-63

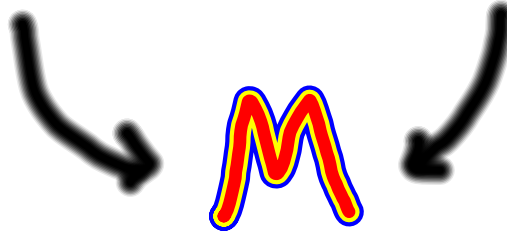(a) house purchased for $120,000 annual appreciation 6%

(b) bacteria 180   22% per hour

On the road to becoming.....

proficient with transformating parabolas

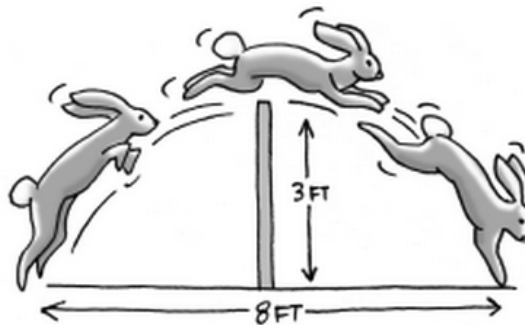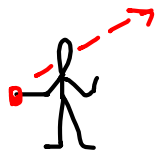proficient at writing functions of parabolos in both standard form and graphing form

M

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

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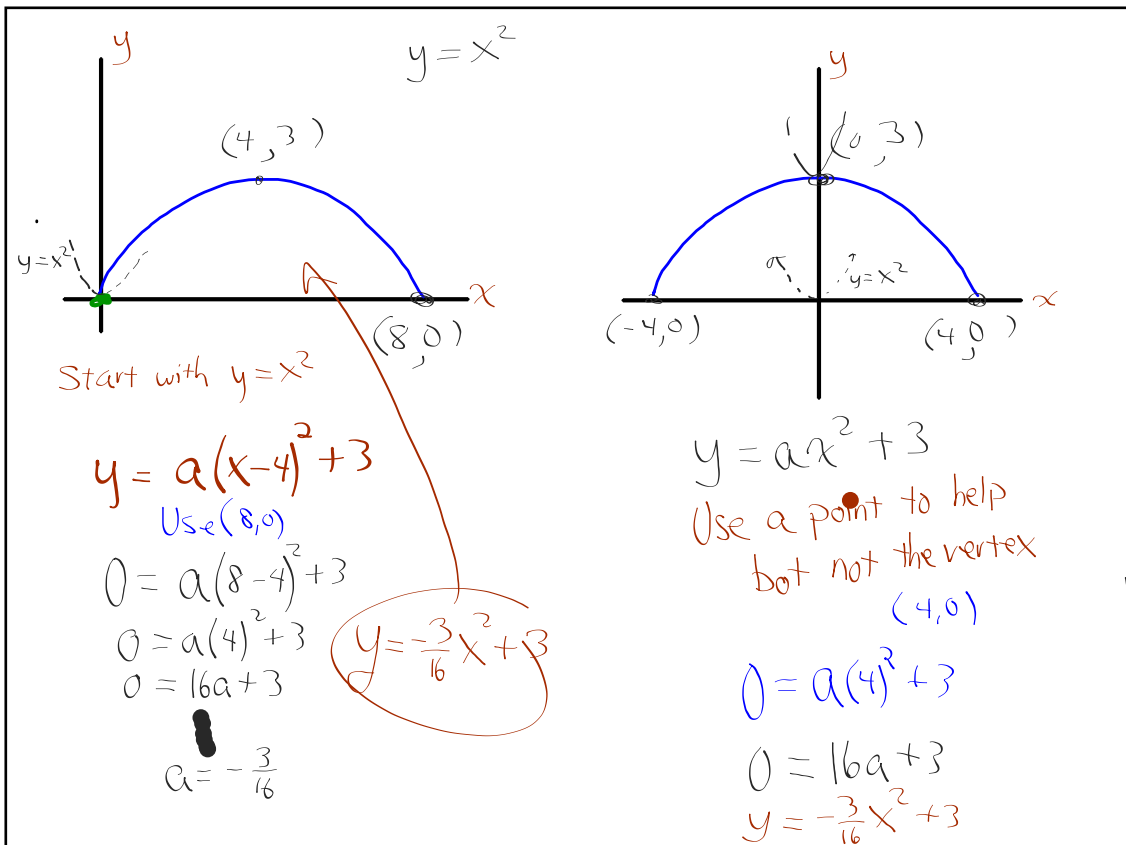
Factored form: $y = a(x + b)(x + c).$

AIM #1

Perform Mathematical Modeling with Parabolas

← Title

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3 FT

8 FT

read 2-64   p.79

3 FT

8 FT

$y = x^2$

$(4, 3)$

$y = x^2$

x

$(8, 0)$

Start with $y = x^2$

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

Use $(8, 0)$

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

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

$0 = 16a + 3$

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

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

---

y

$(0, 3)$

$y = x^2$

$(-4, 0)$ $(4, 0)$

x

$y = ax^2 + 3$

Use a point to help
bot not the vertex

$(4, 0)$

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

$0 = 16a + 3$

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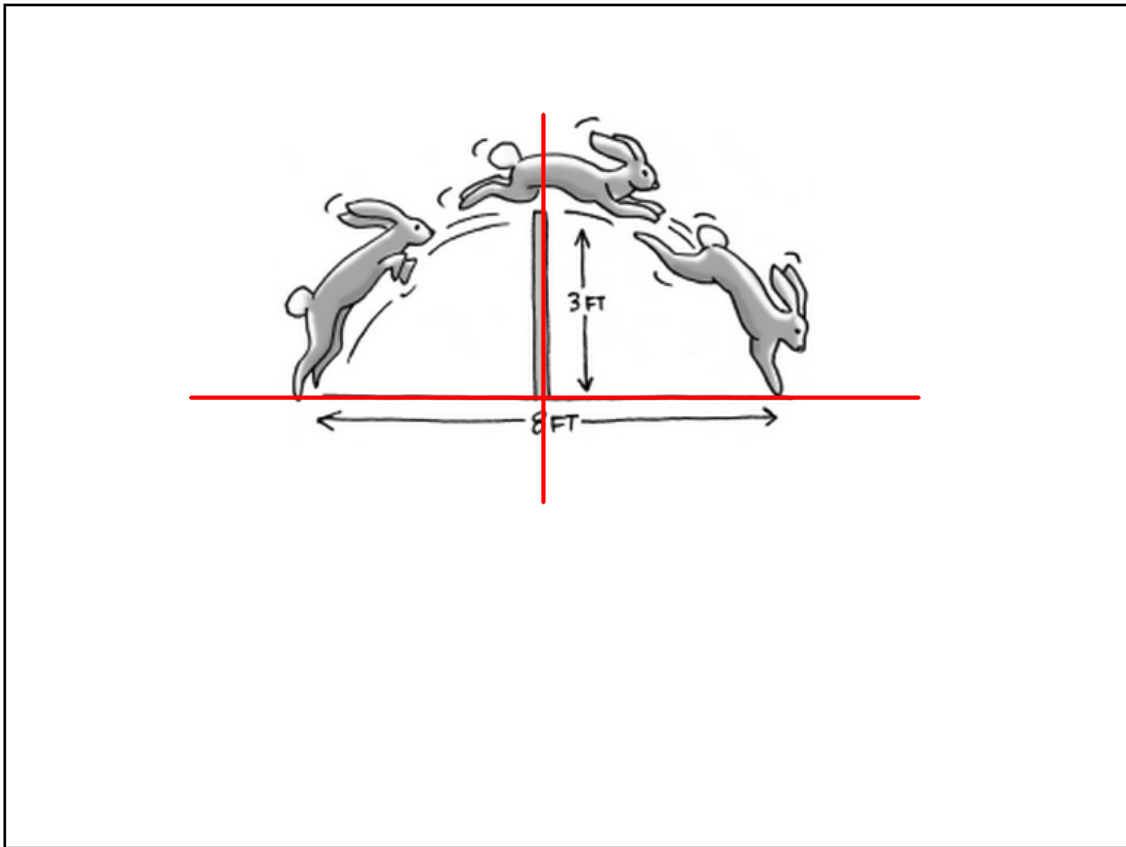
$$y = a(x-4)^2 + 3$$

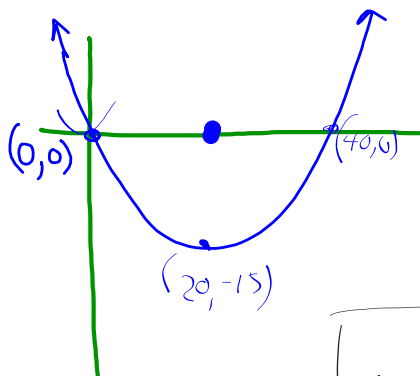$$y = a(x-h)^2 + k \qquad y = a(x-h)^2 + k$$

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.

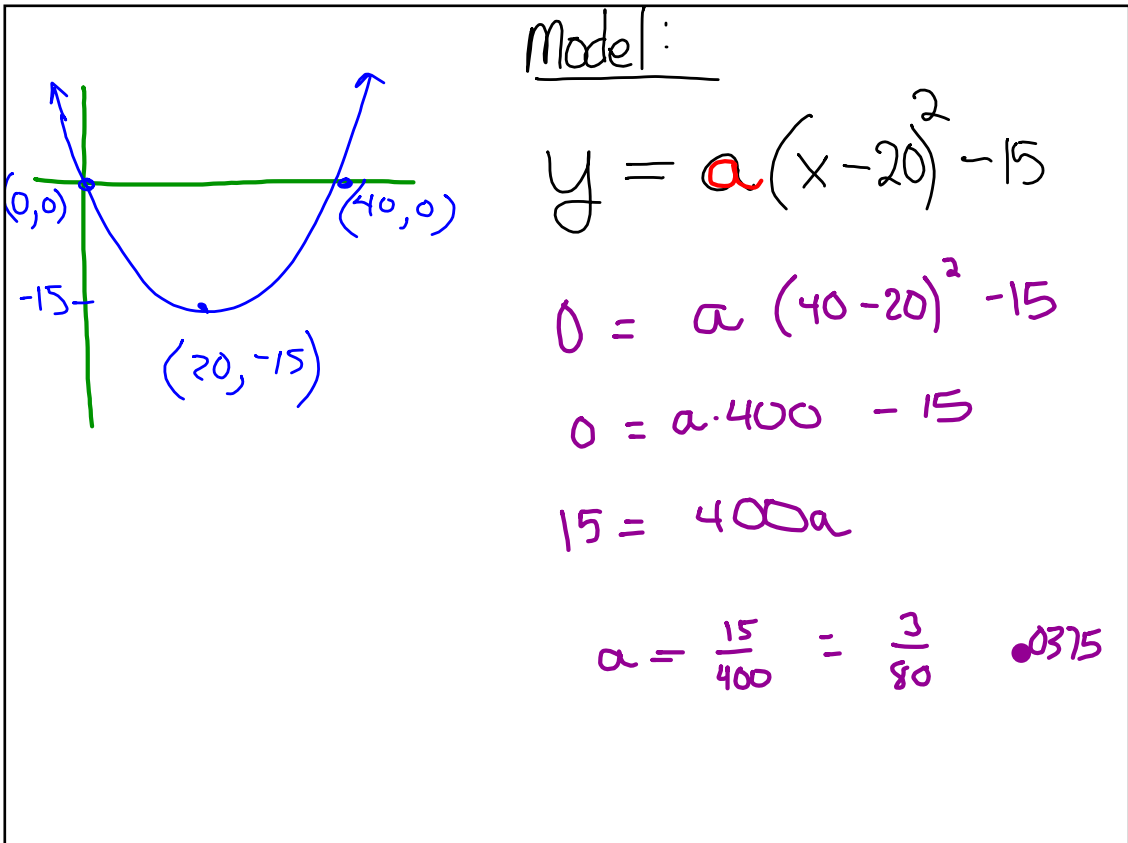$$y = (x)^2 \rightarrow y = a(x-20)^2 - 15$$
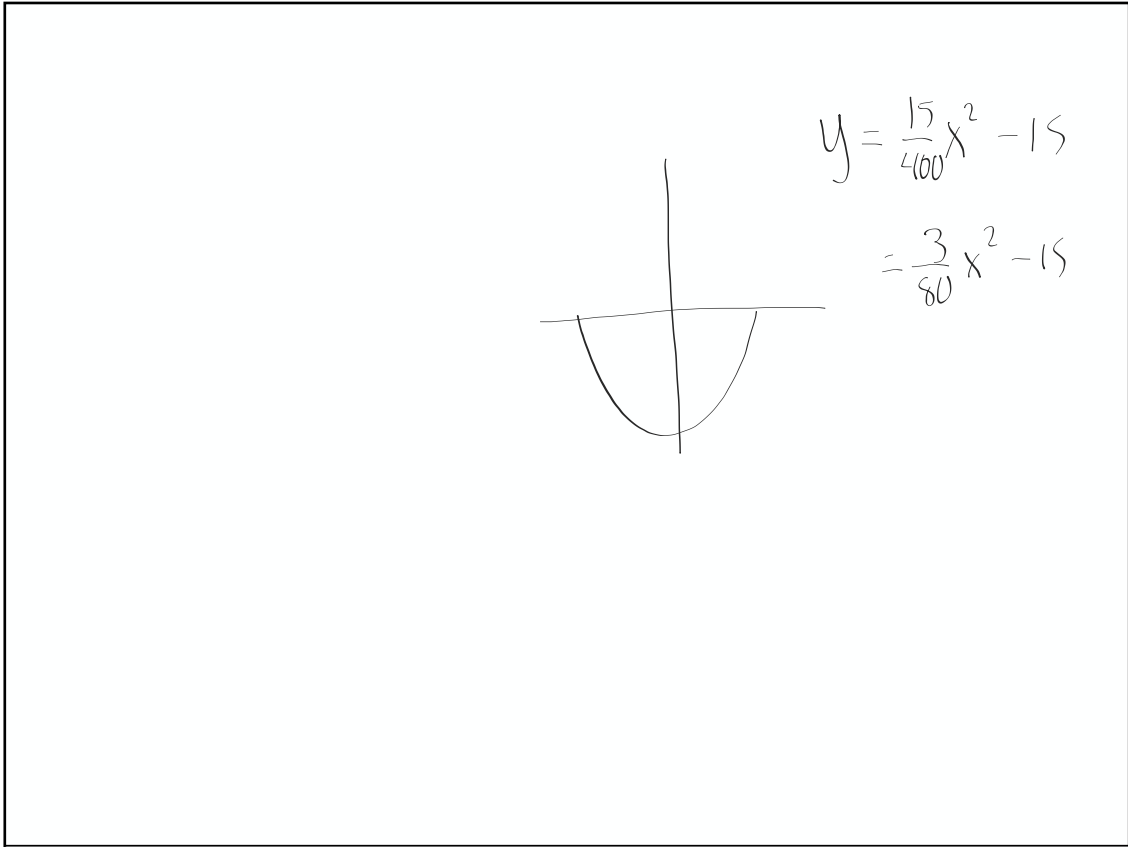$$\text{Use } (40,0)$$
$$0 = a(40-20)^2 - 15$$
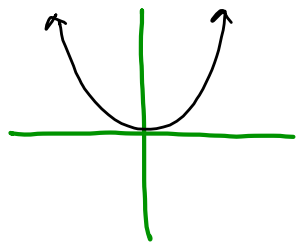$$0 = 400a - 15$$
$$15 = 400a$$
$$a = \frac{15}{400} = .0375$$
$$\text{or } \frac{3}{80}$$

(0,0)   (40,0)   (20,-15)

$$y = \frac{3}{80}(x-20)^2 - 15$$

$$y = \frac{15}{400}x^2 - 15$$

$$= \frac{3}{80}x^2 - 15$$

Model:

$$y = \textcolor{red}{a}(x-20)^2 - 15$$

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

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

$$15 = 400a$$

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

(0,0)

-15

(40,0)

(20,-15)

B.B.

Example of a
Parent Graph

$y = x^2$

for a quadratic
function

Example of a
Parent Graph

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

$$y = x^2$$

for a quadratic
function

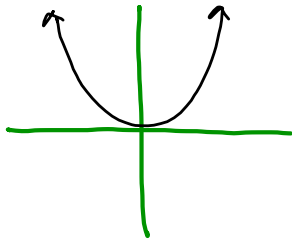$$y = -\frac{1}{2}(x+3)^2 - 7$$

Example of a
Parent Graph

MAKE Transformations
$$y = a(x-h)^2 + K$$
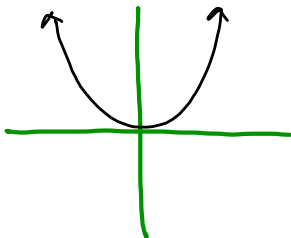
$$y = -\tfrac{1}{2}(x+3)^2 - 7$$

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

$y = x^2$
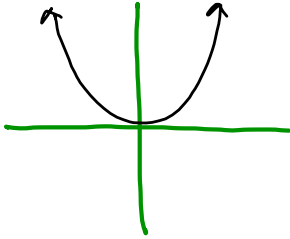
for a quadratic
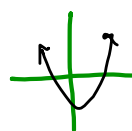function

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MAKE Transformations
$$y = a(x-h)^2 + K$$

← general
equation

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

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

$y = x^2$

for a quadratic
function
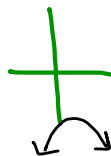
$$y = 1.1(x-4)^2 - 5$$
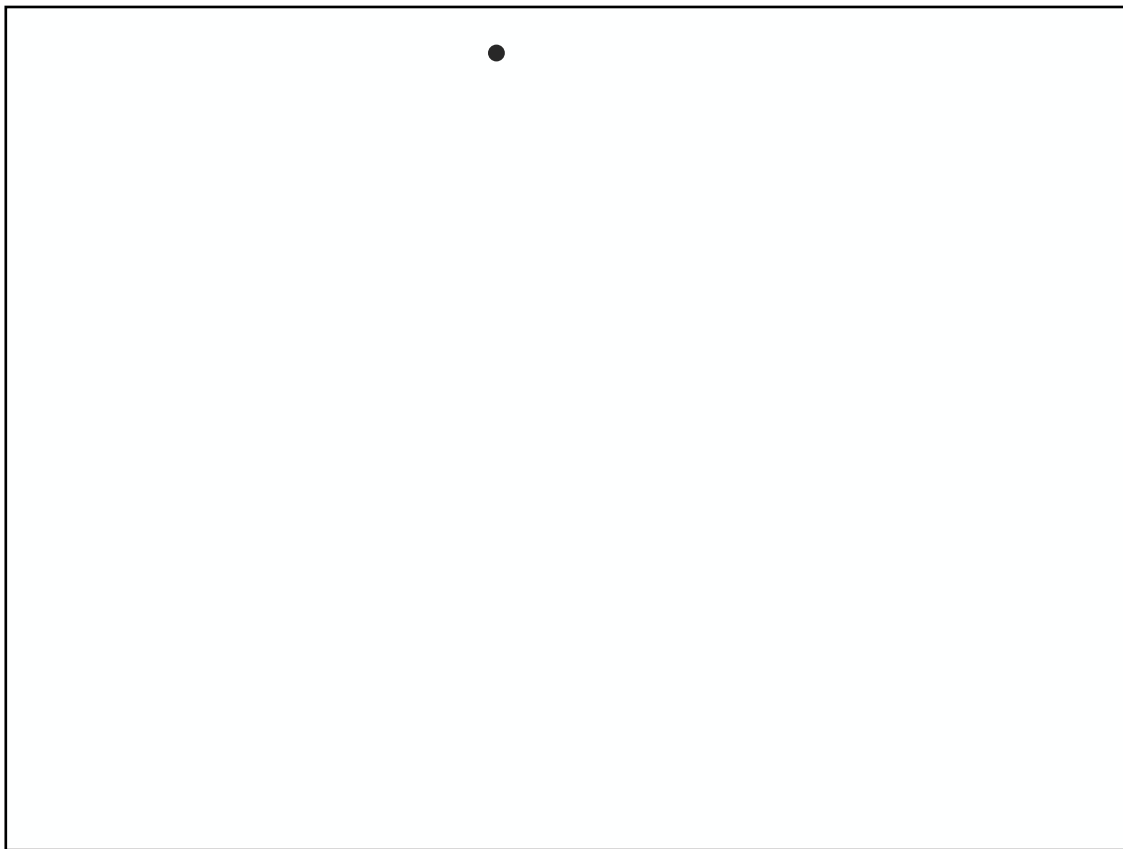
Next Few Lessons
(2.2)

New parent → Transform
function

GOAL: Transform any function
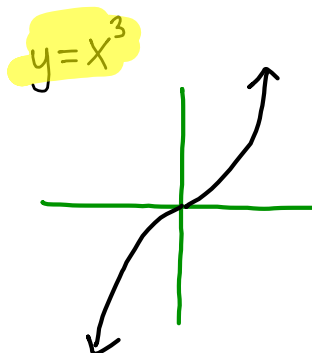   using same techniques

TODAY'S AIM • $y = x^3$

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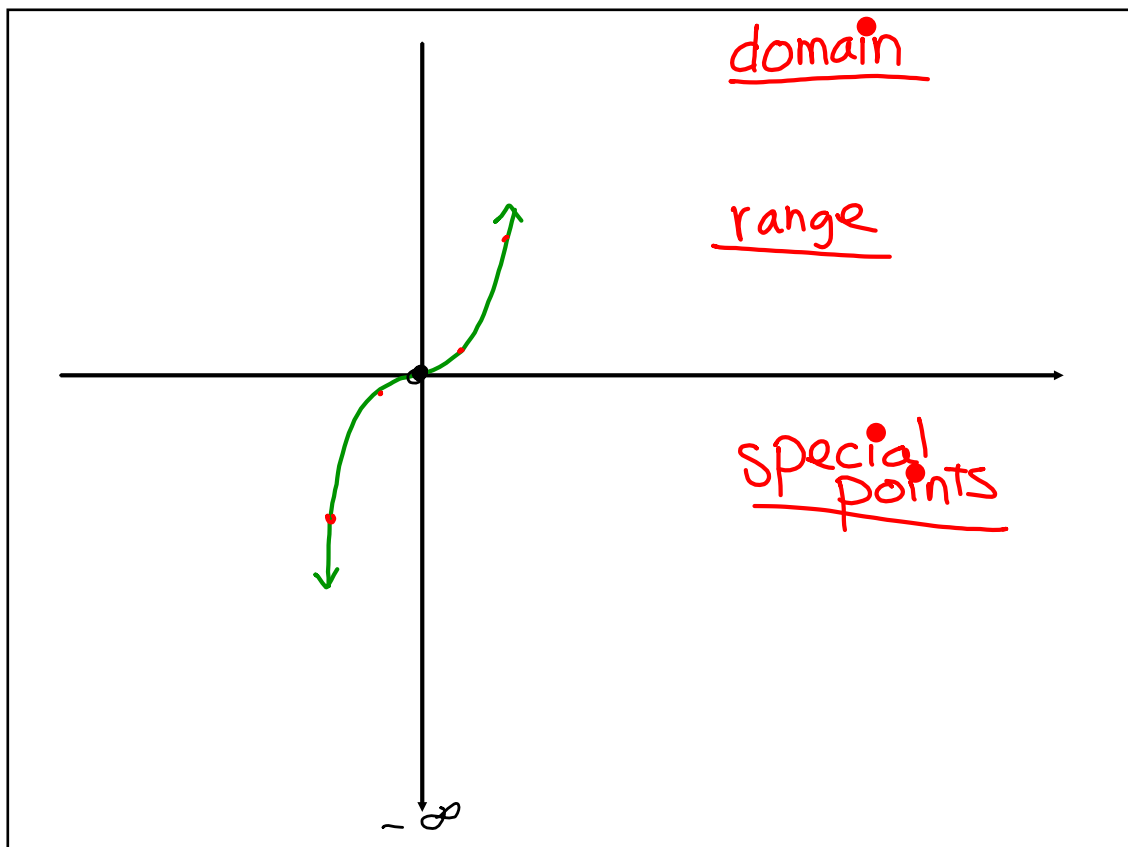Transforming $y = x^3$

$y = x^3$

QUICK Sketch

in your notes

-On a <u>large</u> piece of graph paper

- 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).

domain

range

special points

$-\infty$

Can make one darker

$Y_1 =$ ⟵   experimental
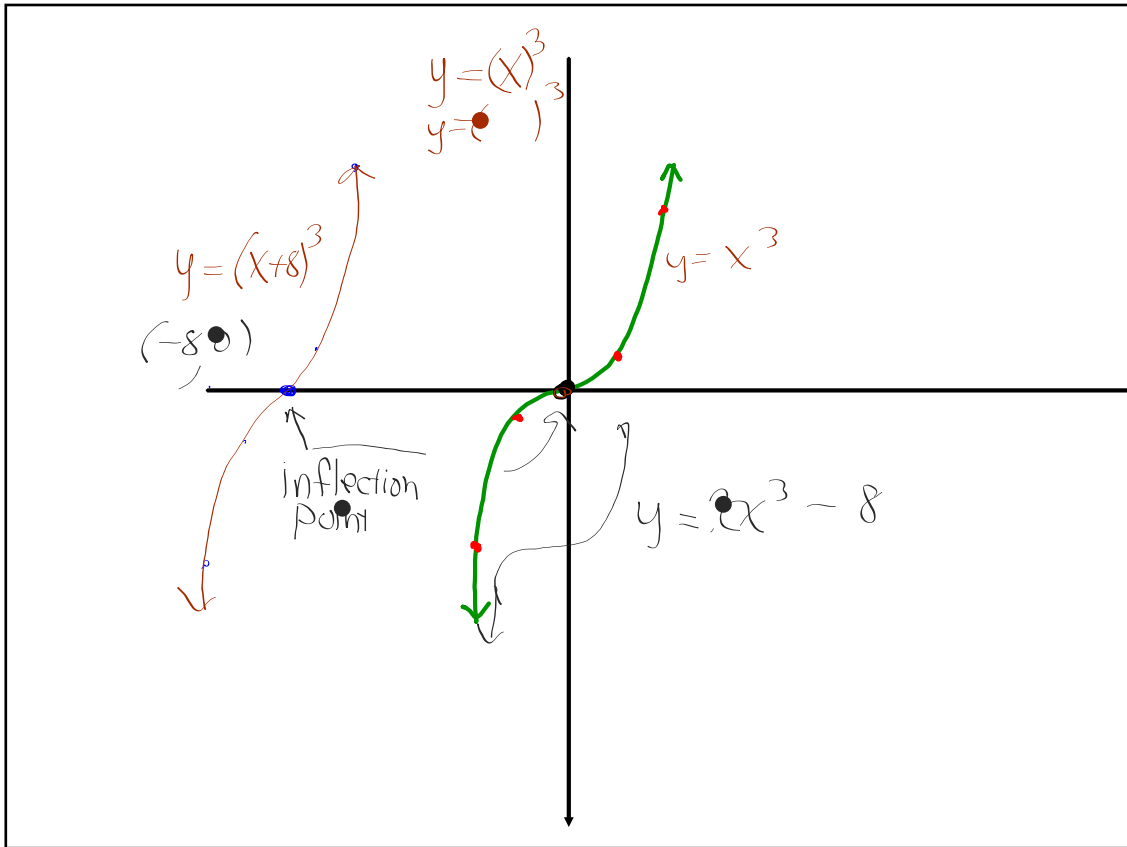   function

$Y_2 = x^3$

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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 (,)

$y=(x)^3$
$y=( )^3$

$y=(x+8)^3$

$(-8, 0)$

$y=x^3$

Inflection Point

$y=.2x^3-8$

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

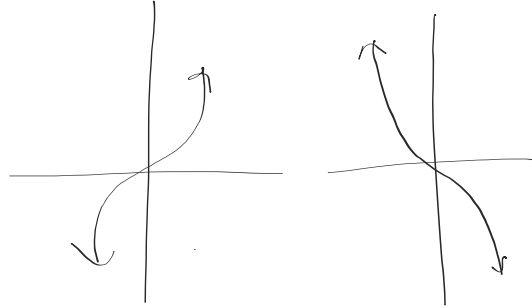- Graph with a dotted line
- label the equation

ⓒ 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 don't need to graph it.

$y = -x^3$

Mid
Chapter
Check

Assignment

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

graph paper needed for #70

back of Warm Up if you want.