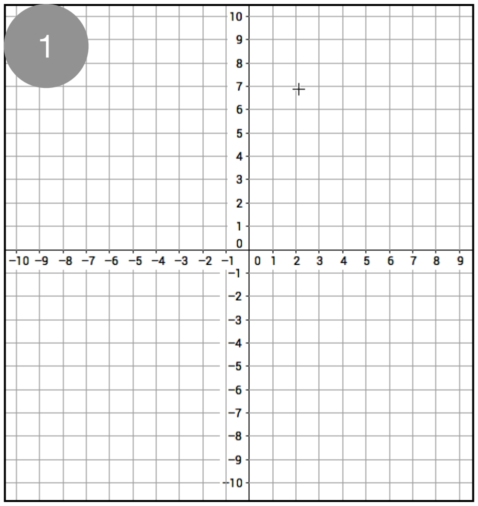
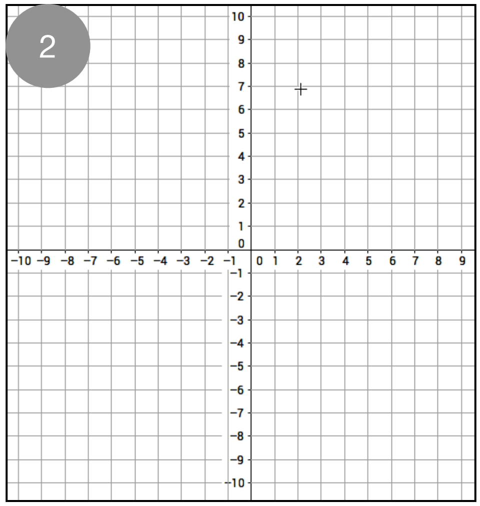
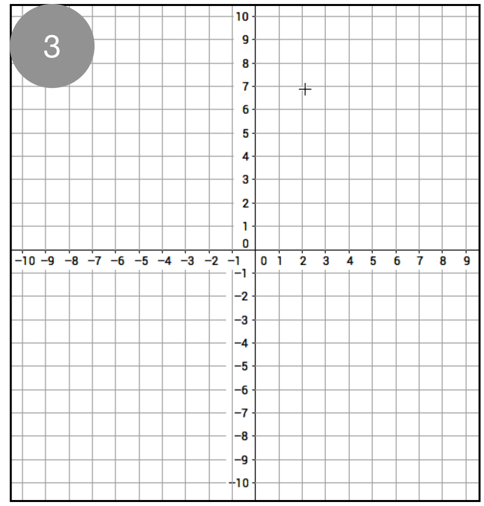
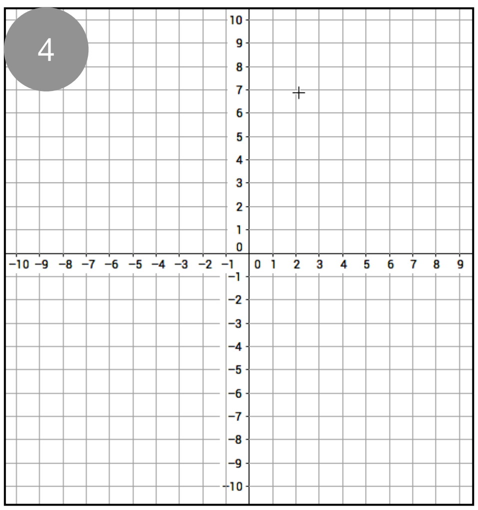
Precalc

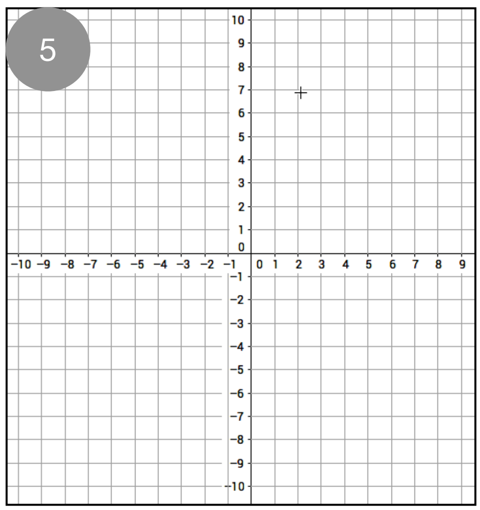
Unit 2 Study Guide

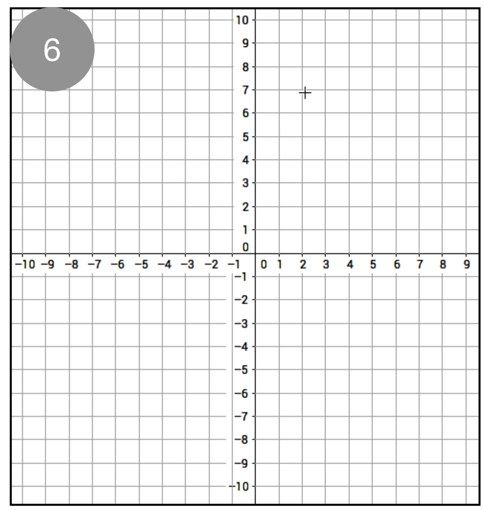


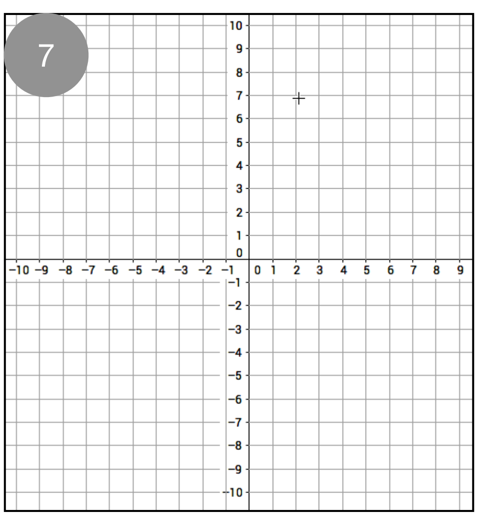


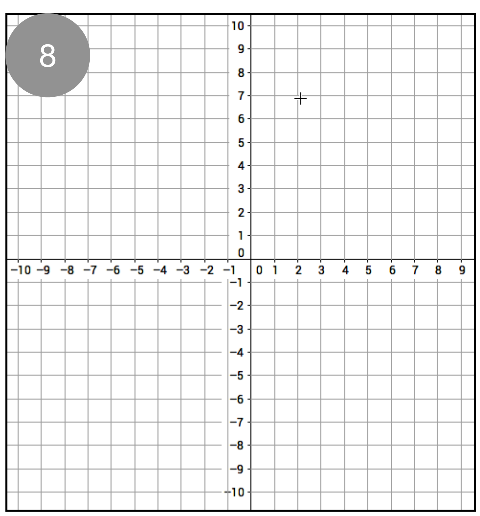












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The following are graphs to be sketch on the opposite side of the paper. You MUST use accurate points. Show all iterations of the multiplier and shifts in different colors. After, state the domain of the function in interval notation.

1. $f(x) = -3\sqrt[3]{x}$

Domain: ________________

2. $f(x) = 3\left[\!\left[\frac{2}{5}x\right]\!\right]$

Domain: ________________

3. $f(x) = \left(\frac{1}{4}x\right)^3 + 4$

Domain: ________________

4. $f(x) = -1|x+2| + 7$

Domain: ________________

5. $f(x) = -2\sqrt{-x}$

Domain: ________________

6. $f(x) = (x-4)^2 - 4$

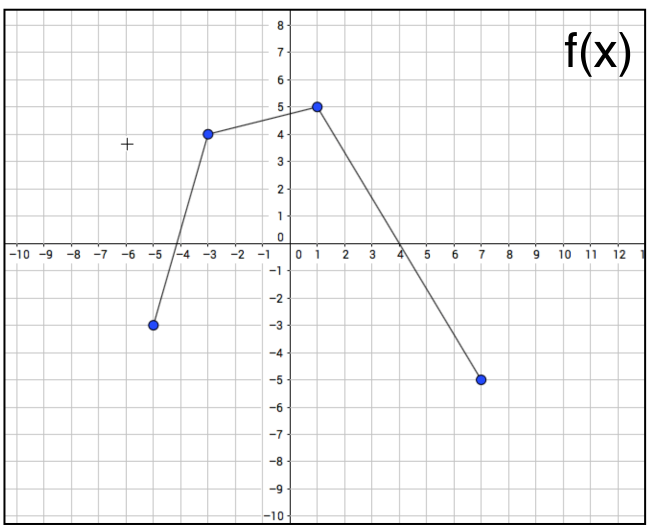
Domain: ________________

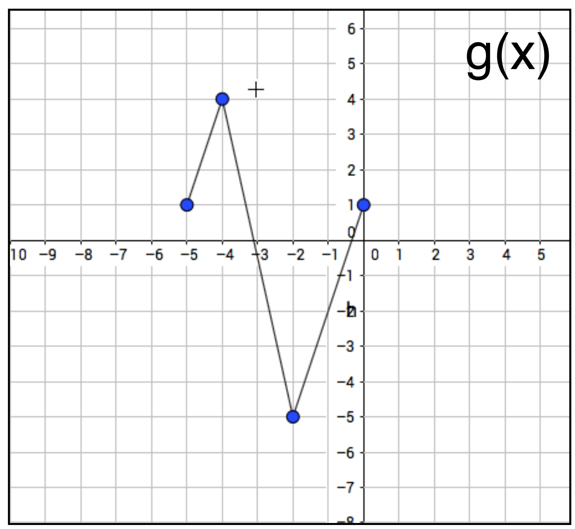
7. $f(x) = \begin{cases} x^2; \ x < 2 \\ -x+6; \ x > 2 \end{cases}$

Domain: ________________

8. $f(x) = \begin{cases} -|x+6| + 3; \ -9 \le x \le -3 \\ x^2 - 9; \ -3 < x < 0 \\ \frac{1}{2}x - 9; \ x \ge 0 \end{cases}$

Domain: ________________





Evaluate the following based on the graphs of f(x) and g(x).

$f(7) =$ ________________

$g(-4) =$ ________________

$f^{-1}(5) =$ ________________

$g^{-1}(-5) =$ ________________

$5f(-5) + g^{-1}(4) =$ ________________

$(f \circ g)(-4) =$ ________________

$(g^{-1} \circ f)(7) =$ ________________

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State three attributes of inverse functions.

a. ______________________________

b. ______________________________

c. ______________________________

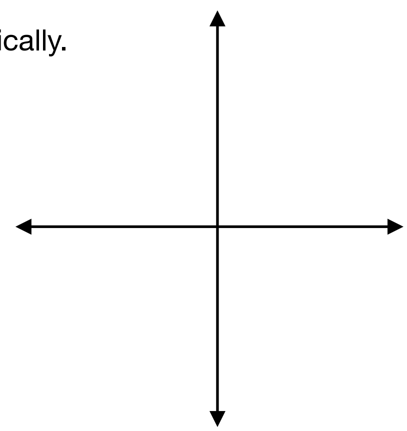
Find the inverse of the following functions. Restrict the domain if necessary. Be prepared to state if the function is one-to-one and describe a test the reveals this attribute. Be prepared to decide if an inverse function cannot be determined by algebraic means.

$h(x)=\frac{-3}{2x-5}+1$ $f(x)=-2\sqrt{x-4}$ $g(x)=2(x-4)^2-1$

Verify the following functions are inverses algebraically, numerically and graphically.

$f(x)=2x^3+3$ $g(x)=\left(\frac{x-3}{2}\right)^{1/3}$

x	f(x)	g(x)



Suppose a cylinder's radius is changing 4 inches per minute. If the cylinders is 14 inches tall AT ALL TIMES, write a function for the cylinder's volume (cubic feet) with respect to time in minutes. Then use the function and your graphing calc to complete the table below.

$V=\pi r^2 h$ is the volume of a cylinder so you don't have to google it.

Time in Minutes	Volume in Cubic Feet
1	
5	
10	
20	

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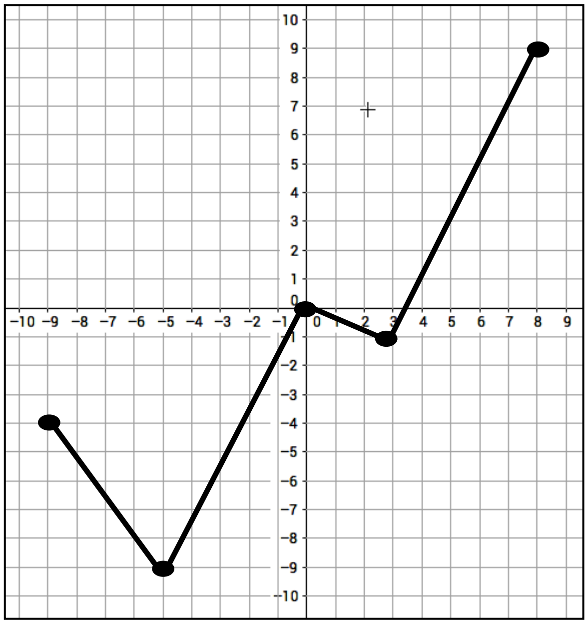
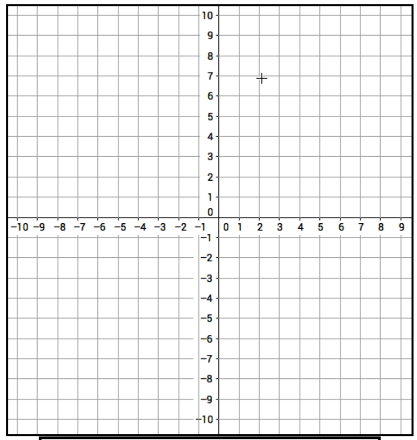
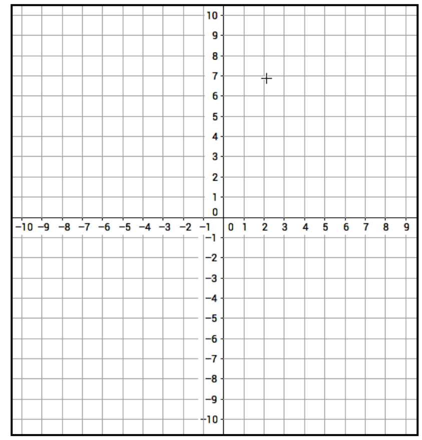


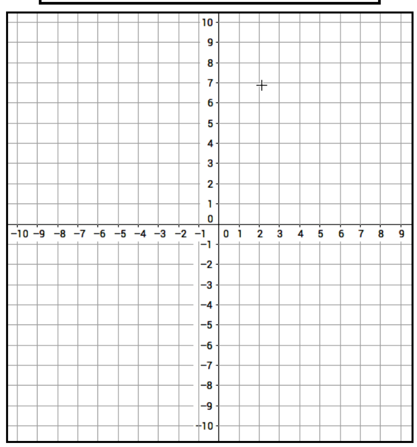
Given the graph of f(x) above, sketch graphs of the transformations of f(x) described on the right



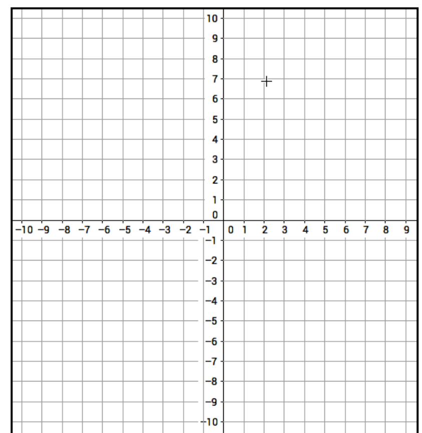
$\frac{1}{2}f\left(x-1\right)$



$f\left(2x\right)-1$



$\left|f\left(x\right)\right|$



$f^{-1}\left(x\right)$

The ***POSITION*** of a moving particle on a coordinate line is given by the function,

$$s\left(t\right)=\frac{2}{3}t^3-\frac{13}{2}t^2+15t+10$$

where t is measured in minutes and s(t) is inches.

The ***VELOCITY*** of a particle is

$$v\left(t\right)=2t^2-13t+15$$

where t is measured in minutes and v(t) is inches per minute.

The ***ACCELERATION*** of a particle is

$$a\left(t\right)=4x-13$$

where t is measured in minutes and a(t) is inches per minute squared.

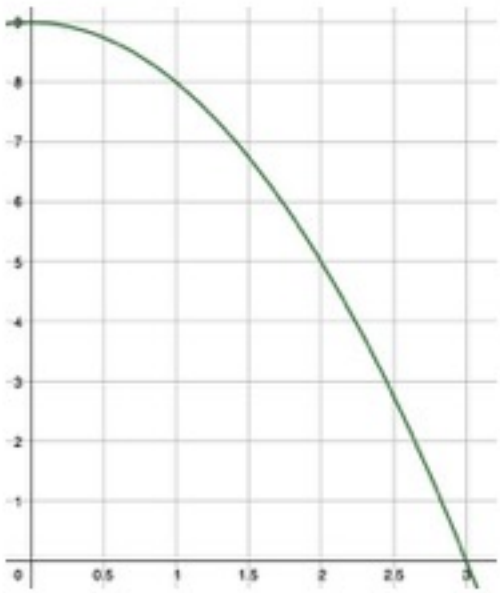
Answer the following questions about a particle that moves on a horizontal coordinate line.

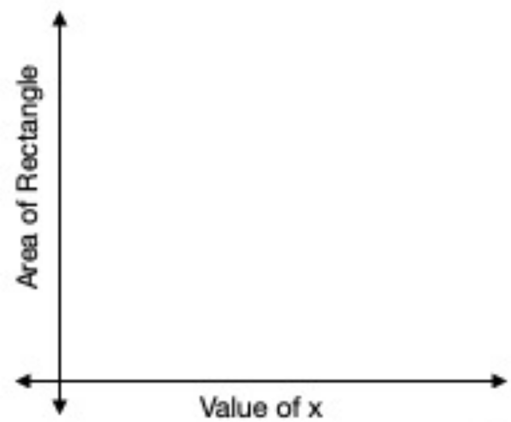
1. Where does the particle start?
2. When is does the particle stop?
3. Where does the particle stop?
4. When is the particle moving to the right/left?
5. When is the particle speeding up/ slowing down?

Application: Inscribed Shapes

1. Sketch
2. Write everything you know about the problem
3. Combine to make a function in one variable.
4. Use function with technology to answer question

What is the largest area of a rectangle that can be inscribed in the first quadrant and below the curve $y=-x^2+9$





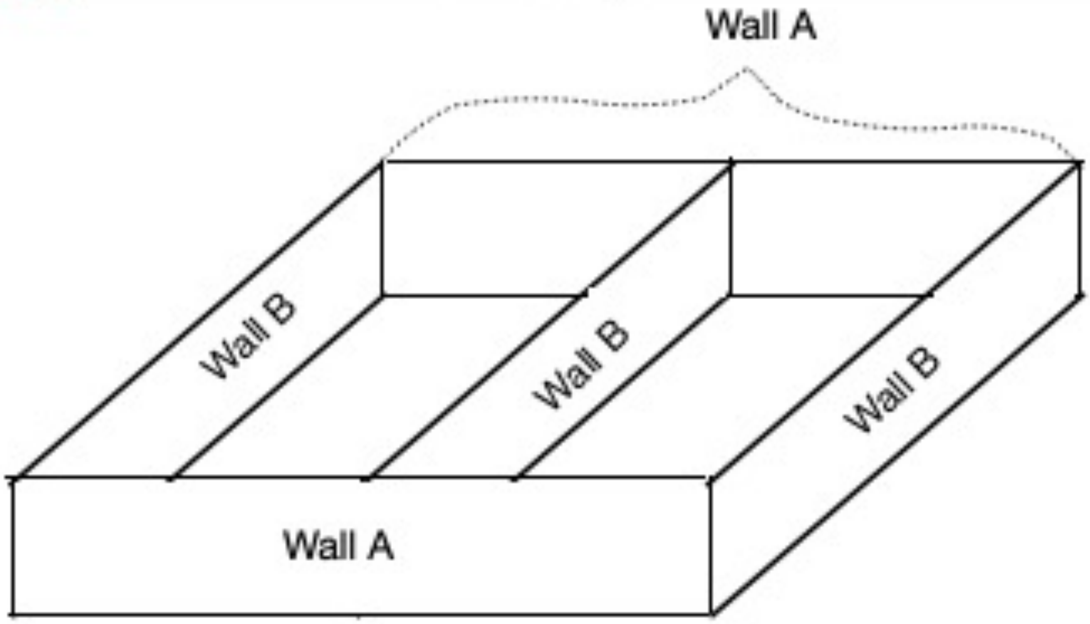
Application: Greatest Area

Suppose you have to build some adjacent hamster corrals as shown below. Each corral needs to be same size. Horizontal portions of the corral are (Y) and the vertical portions are (X). You have 1200 feet of fencing to work with.

a. What is the Area Function of ALL the corral in terms of "x"?

b. What is the greatest area of all the corrals you can build based on the scenario above?

c. What would the dimensions of a single corral be?

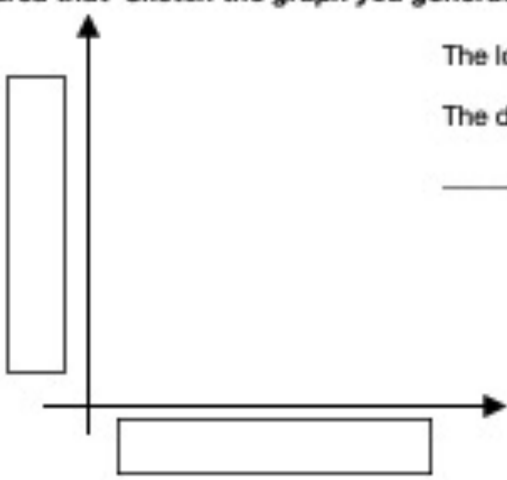


You are hired to make a rectangular storage area that is a total of 5000 square feet. Walls A cost 25 dollars per linear foot and Walls B cost 30 dollar per linear foot. You are hired to minimize the cost of the storage area by some careful planning with precalculus. For argument sake, all Walls are 2-dimensional (they have no thickness)

Write a function for the COST of the storage area as a function of the length of the wall A.

C (A) = ____

Use the function you wrote above to find the lowest cost possible. Also state the dimensions of the storage area that Sketch the graph you generated below. Label the axis accordingly.



The lowest possible cost is (to the nearest hundredth): ________________

The dimensions of the total storage are (to the nearest thousandth)

__________________ by ____________________