Math-8 Exam Chapter 2

Name: _____

This exam is closed book and notes. You may use a calculator; however, no cell phones or tablets are allowed. Show all work; there is no credit for guessed answers. All values should be exact unless you are specifically asked for an approximate value answer.

1). Identify each of the following formulas. Be very specific. Differentiate between general and standard forms and call out important points (like the center of a circle).

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ _____

$d = [(x_1 - x_2)^2 + (y_1 - y_2)^2]^{1/2}$ _____

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ _____

$m = \frac{y_1-y_2}{x_1-x_2}$ _____

$y - y_1 = m(x - x_1)$ _____

$y = mx + b$ _____

$m_1 = m_2$ _____

$m_1 m_2 = -1$ _____

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

$x^2 + y^2 + Dx + Ey + F = 0$ _____

2). You have two dogs: Fido and Fluffy. Each dog is tied to its own stake in your backyard by a leash. Fido's stake and leash allow him to roam around an area defined by:

$$(x-2)^2+(y-1)^2=9$$

Fluffy's stake and leash allow her to roam around an area defined by:

$$x^2+y^2-10x-8y+37=0$$

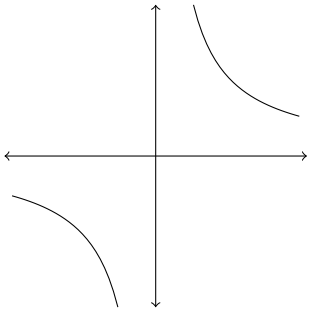
a). What are the coordinates of Fido's stake and the length of his leash?

b). What are the coordinates of Fluffy's stake and the length of her leash?

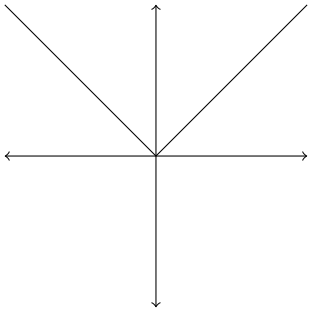
c). What is the equation of the line between the two stakes, in slope-intercept form?

d). It is mating season. Fido and Fluffy and not fixed, but you do not want them to mate. To be safe, you decide to erect a straight wall that is perpendicular to the line joining the two stakes and going through the midpoint of that line. What is the equation of the wall, in slope-intercept form?

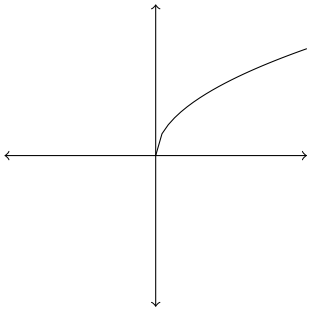
3). Identify each of the following standard functions:



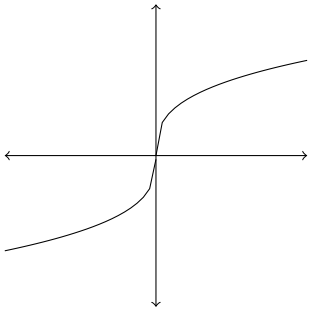
$y =$



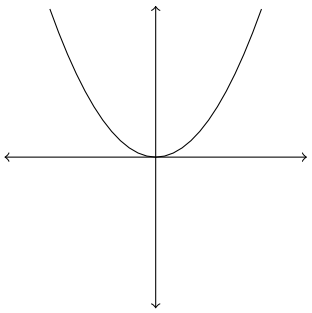
$y =$



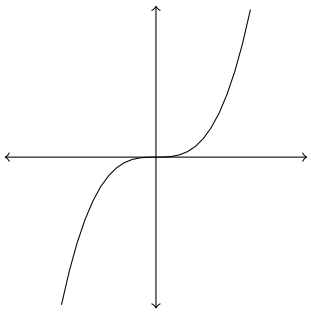
$y =$



$y =$



$y =$



$y =$

4). Consider the function:

$$f(x) = -(x-1)^2 + 4$$

a). Provide a list of transformations in the order that they should be applied. Remember to start with one of the standard functions.

i.

ii.

iii.

iv.

b). Determine any x-intercepts.

c). Determine any y-intercepts.

d). Sketch the function. Be sure to label all key points!

e). On which interval(s) is the function increasing (if any)?

f). On which interval(s) is the function decreasing (if any)?

g). What are the maxima (if any)?

h). What are the minima (if any)?

i). What is the domain?

j). What is the range?

5). Consider the function:

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

a). Determine two functions $f(x)$ and $g(x)$ such that:

$$h(x) = (f \circ g)(x)$$

You must specify something other than the trivial answer (i.e., neither of your functions can be just x).

b). Using your answer for $g(x)$, calculate the difference quotient:

$$\frac{g(x+h) - g(x)}{h}$$