

Quiz #1

January 31, 2012

While you are permitted to use a calculator, you must show all work to solve by hand for credit.

Do work on separate paper and attach answers / work in sequential order (1, 2, 3, 4, 5, 6, 7).

- 1.) Find all solutions to the equation below. [15 Points]

$$\|7 - 3x| - |4 + x|| - x = 1$$

- 2.) See the attached function $y = f(x)$ in **Figure 1**. Specifically state what transformations need to be performed to $y = f(x)$ in order to graph the function $y = -f\left(\frac{1-x}{2}\right) + 4$. Then, sketch the graph of the new function on the same grid. [10 Points]

- 3.) Given that the point $(3, -10)$ is on the graph of $y = f(x)$, what point must fall on the graph of the function $y = -\frac{4}{5}f\left(\frac{2x+12}{8x-1}\right) + \frac{9}{2}$? [10 Points]

- 4.) Given $\triangle ABC$ with $A(-1, 8)$, $B(3, -2)$, $C(9, 4)$, find the coordinates of the circumcenter of the triangle (where the perpendicular bisectors intersect) and make it clear that all of the perpendicular bisectors intersect there. [10 Points]

- 5.) Complete the square on the parabola $f(x) = -3x^2 - 9x - \frac{47}{4}$ and use this form to identify the transformations needed to move the graph of $y = x^2$ into the graph of $y = f(x)$. [10 Points]

- 6.) Find the center point and radius of the circle $9x^2 + 18x + 9y^2 = 16 + 72y$. [10 Points]

- 7.) Create the system of inequalities that yields the region shown in **Figure 2**. [10 Points]

Bonus.

Determine the focal point and directrix of the parabola with equation [3 Points]

$$3y^2 + 12y + 12 + 5x + 20 = 0$$

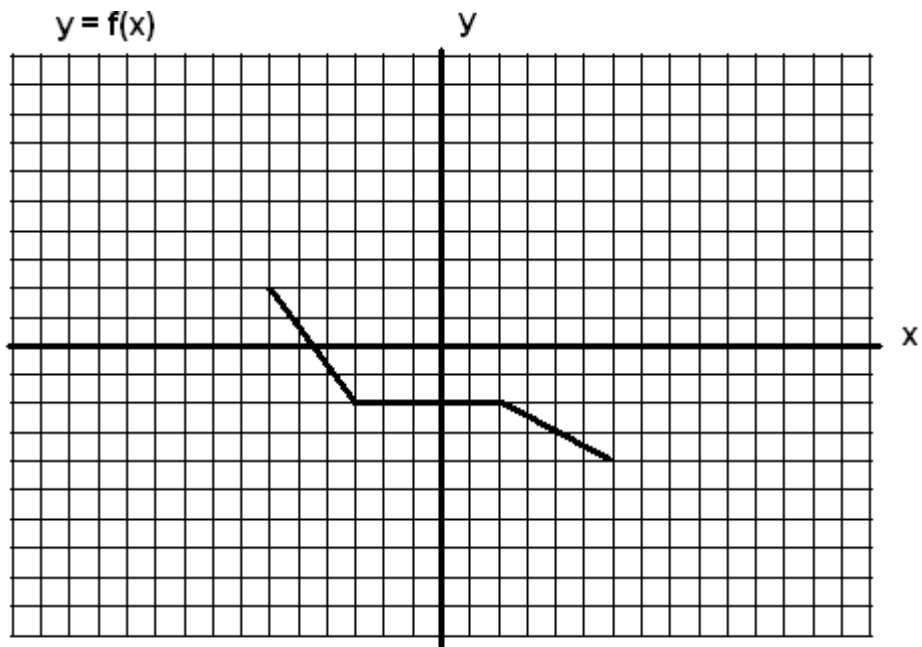


FIGURE 1

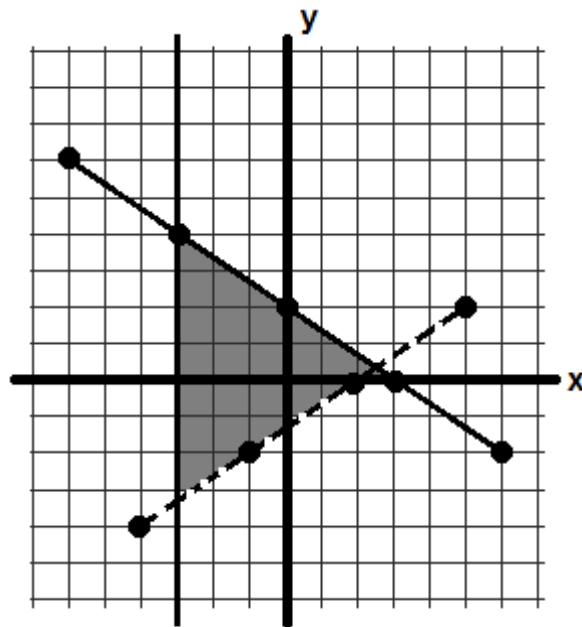


FIGURE 2