MATH 1113 Precalculus
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Name: Solutions
Date: June 16, 2017

Quiz No. 2

Show all of your work, label your answers clearly, and do not use a calculator.

Problem 1 (25 points) Find the equations of the following lines:

a The line parallel to the x-axis going through the point $(-3, 5)$.

$y = 5$

b The line perpendicular to $y = 5x - 2$ going through the point $(\frac{7}{3}, \frac{7}{6})$.

$5m = -1 \Rightarrow m = \frac{-1}{5}$

$y - \frac{7}{6} = \frac{-1}{5}\left(x - \frac{7}{3}\right)$

c The line going through the two points $(3, \frac{3}{5})$ and $(-6, -5)$.

$m = \frac{-5 - 3/5}{-6 - 3} = \frac{-\frac{25}{5} - \frac{3}{5}}{-9} = \frac{-28/5}{-9} = \frac{28}{45}$

$y - (-5) = \frac{28}{45}(x - (-6))$ or $y - \frac{3}{5} = \frac{28}{45}(x - 3)$

d The line parallel to $y = x + 3$ going through the point $(-6, -5)$.

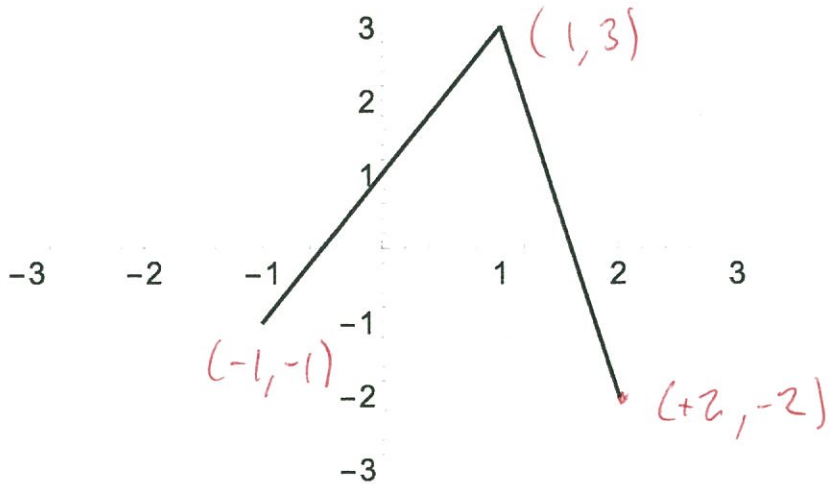
$m = 1$

$y - (-5) = (1)(x - (-6))$

$y + 5 = x + 6$

$y = x + 1$

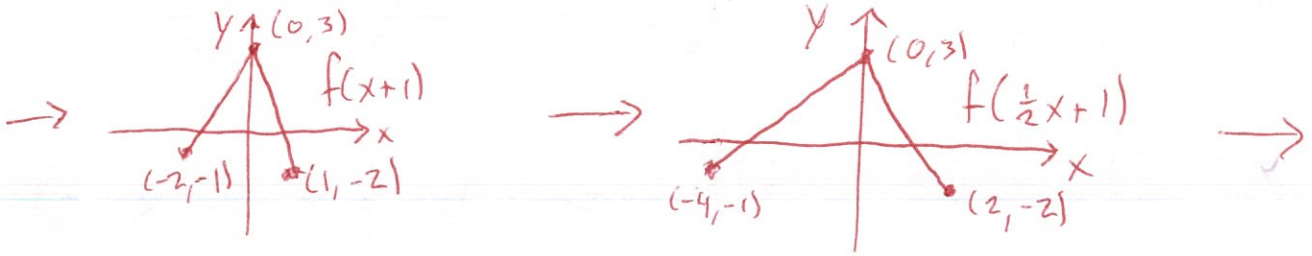
Problem 2 (25 points) Given the graph of $f(x)$ below:

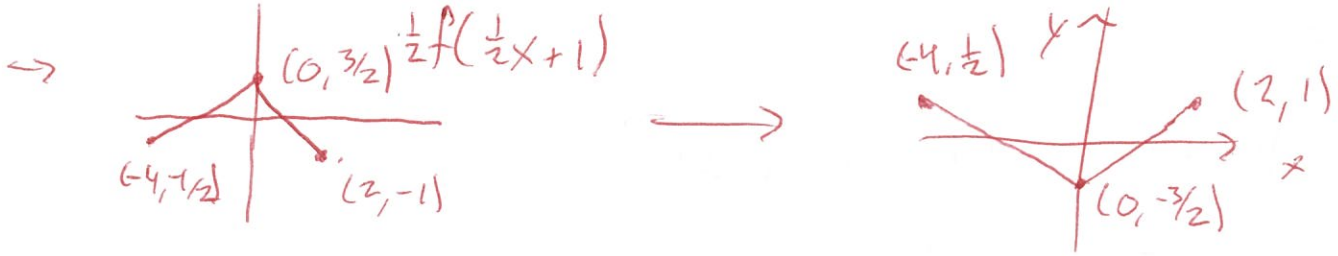


a Describe in words all of the graph transformations needed to transform $f(x)$ into $g(x) = -\frac{1}{2}f(\frac{1}{2}x + 1)$.

Horizontal shift by 1 to left
Horizontal stretch by factor of $\frac{1}{2}$
Vertical shrink by factor of $\frac{1}{2}$
Reflection over x-axis.

b Graph the function $g(x) = -\frac{1}{2}f(\frac{1}{2}x + 1)$





Problem 3 (25 points) Solve the following inequalities for the set of x-values that make them true and give your answer in interval notation.

a $3x + 2 < 6$

$3x < 4$

$x < \frac{4}{3}$

$(-\infty, \frac{4}{3})$

b $2x + 1 > 4$ AND $-x + 8 > -3$

$2x + 1 > 4$

$2x > 3$

$x > \frac{3}{2}$

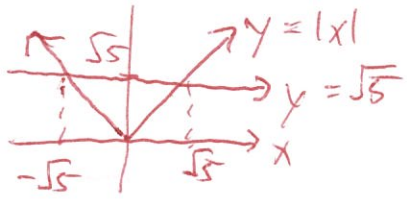
$-x + 8 > -3$

$-x > -11$

$x < 11$

$\Rightarrow (\frac{3}{2}, \infty) \cap (-\infty, 11) = (\frac{3}{2}, 11)$

c $|x| \leq \sqrt{5}$



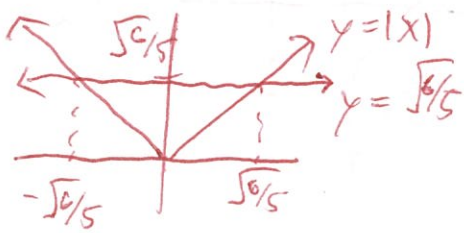
$\Rightarrow [-\sqrt{5}, \sqrt{5}]$

d $5x^2 \geq 6$

$x^2 \geq \frac{6}{5}$

$\sqrt{x^2} \geq \sqrt{6/5}$

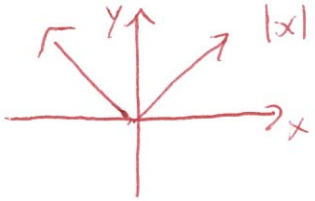
$|x| \geq \sqrt{6/5}$

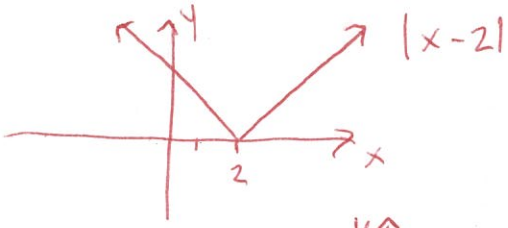


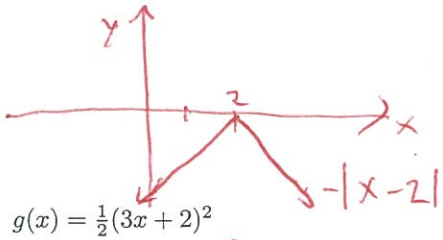
$\Rightarrow (-\infty, -\sqrt{6/5}] \cup [\sqrt{6/5}, \infty)$

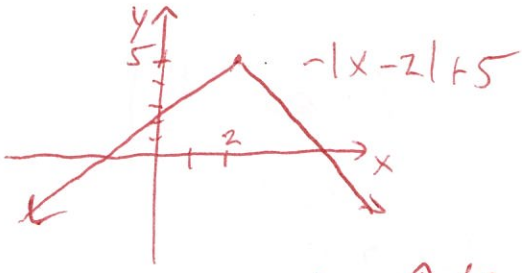
Problem 4 (25 points) Graph each of the following functions:

a $f(x) = -|x-2|+5$

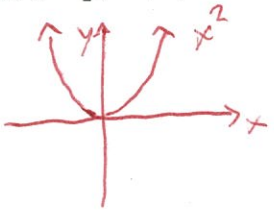


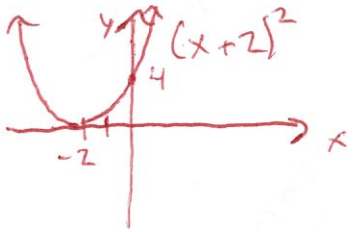


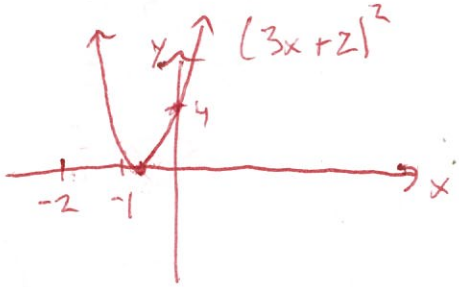


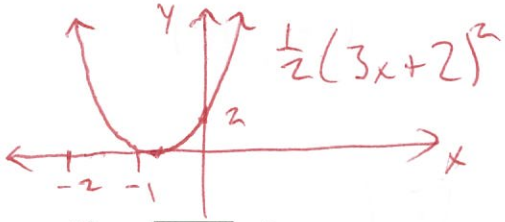


b $g(x) = \frac{1}{2}(3x+2)^2$









c $r(t) = \sqrt{-x-1}-3$