Math 108 Exam #3
November 30, 2016

Time: 1 hour and 25 minutes
Instructions: Show all work for full credit.
No outside materials or calculators allowed.
Extra Space: Use the backs of each sheet
for extra space. Clearly label when doing so.

Name: _____

ID #: _____

Instructor/Section: _____

*"I pledge by my honor that I have abided by the
NJIT Academic Integrity Code."*

_____ (Signature)

Problem(s)	Score	Total

1. Evaluate the following $f(x) = 2x^2 + 2x + 2$ and $g(x) = x - 4$ **(16 points)**:

a. $f + g$

b. $f - g$

c. fg

d. $\dfrac{f}{g}$

2. Find the inverse of the following functions: (**10 points**)

a) $f(x) = \dfrac{5+x}{3x+2}$

b) $h(x) = \sqrt{2x+3}, x \geq \dfrac{-3}{2}$

3. Use the given conditions to find the slope-intercept form of each non-vertical line.

a) Parallel to $y = \dfrac{-2}{3}x + 5$ and passing through (4,7) (**3 points**)

b. Perpendicular to $y = \dfrac{1}{5}x + 3$ and passing through the point (-3,-5) (**3 points**)

4. Find the domain of the following functions: **(6 points)**

a. $f(x) = \sqrt{2x+7}$

a._____

b. $f(x) = \dfrac{x+1}{x^3 - 9x}$
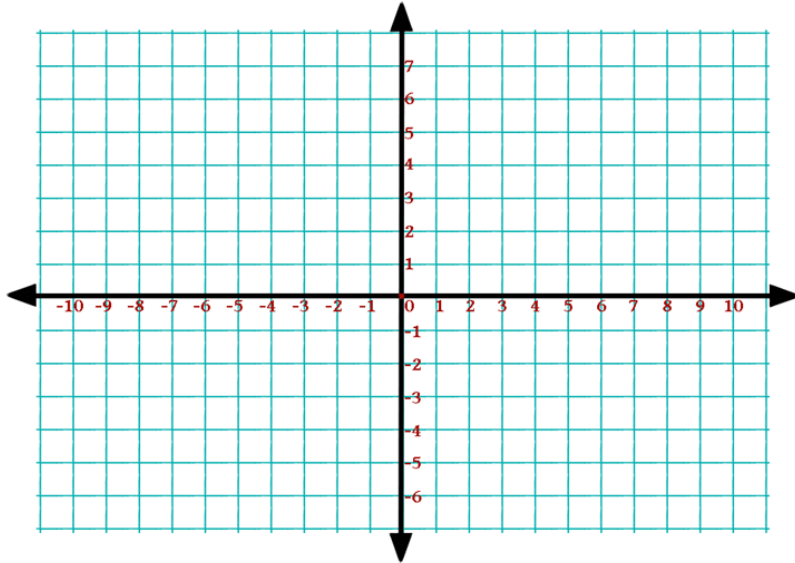
b._____

c. $f(x) = \dfrac{x-4}{\sqrt{x-2}}$

c._____

5. **(7 points)** Express $f(x) = x^2 - 6x + 11$ in the form $a(x-h)^2 + k$. Then state the vertex, axis of symmetry and the x and y intercepts.

5)_____

6.   Find the function that is finally graphed after each of the following transformations is applied to the graph of $y = \sqrt{x}$ in the order stated. Then graph the function.

a)   Shift down 2 units
b)   Shift right 3 units
c)   Reflect about the x-axis   **(8 points)**
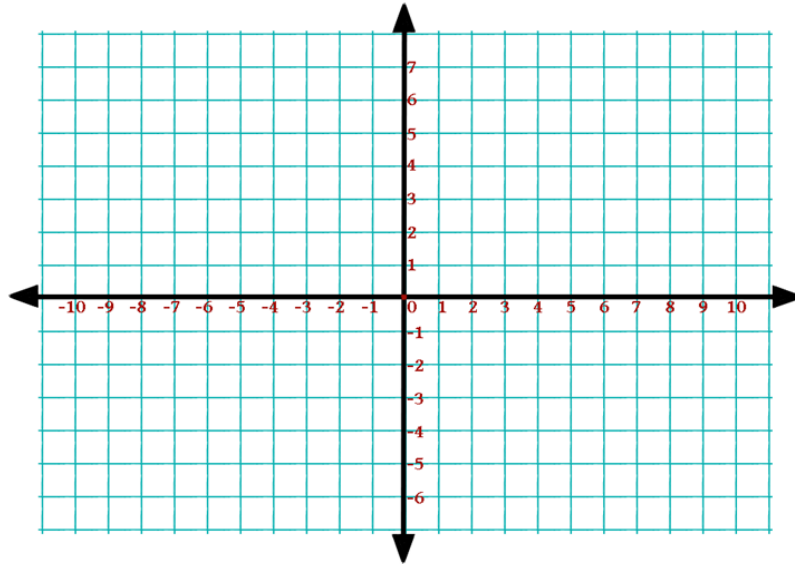

7. Find the line that passes through the points (-1,3) and (3,3). Be sure to put you answer in slope-intercept form. **(7 points)**

7)_____

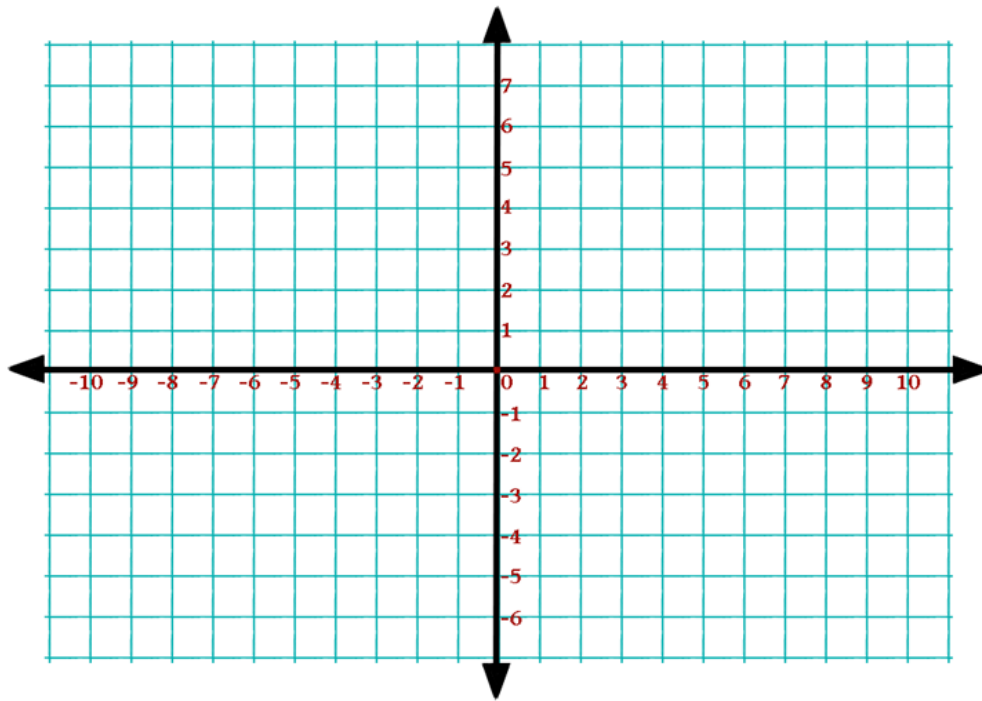8. For $F(x) = x^2 + 2x - 3$ evaluate $\dfrac{f(x+h) - f(x)}{h}$. **(8 points)**

8)_____

9. Graph the following function $f(x) = 2x^2 + 8x + 7$. For full credit identify the vertex, axis of symmetry and the x and y intercepts if they exist. **(6 points)**

10.   **(10 points)** Find the standard form of the equation of the parabola that satisfies the given conditions. Vertex at (4, -7) and passing through (0,-4).

Then sketch the graph.

11. **(6 points)** If $f(x) = \dfrac{2}{|x|}$, $g(x) = x - 5$ find each composite function and describe the domain.

Make sure the function is in simplest form and the domain is in interval notation:

a) $(f \circ g)(x)$

11a)_____

b) $(g \circ f)(x)$

11b) _____

12) **(10 points)** If $f(x) = \begin{cases} x+5, x \le -3 \\ 5, \text{ if } -3 < x < 1 \\ 5x-4, \text{ if } x \ge 1 \end{cases}$

Graph f(x)