Name _____ Quarter 1

Pre-Calculus Quarter Exam- Review

1. If $f(x)=x^3-3x+6$, find the following:
   a. $f(-2)$ b. $f(x-2)$

2. If $h(x)=\sqrt{x-25}$, $f(x)=x-1$, and $g(x)=x^2$, find and expression for the following:
   a. $(g\,o\,f)(x)$ b. $(f\,o\,h\,o\,g)(x)$
   c. Evaluate $\frac{f(x+h)-f(x)}{h}$ if $f(x)=x^2-5x+4$

3. Find the inverse of *f*(x) if $f(x)=3x-8$

4. Find the inverse of *f*(x) if $f(x)=\sqrt{4x-3}$

5. Find the slope of the line:
   a. Which passes through the points (4,-4) and (-2,7)
   b. Whose equation is -7x + 4y = 12
   c. Perpendicular to a line whose equation is y + 5 = 3(x – 3)
   d. Parallel to a line whose equation is y = 2x-5

6. For each, write the equation of the line in point-slope, slope-intercept, and standard form:
   a. Whose slope is 3 and which passes through (1,-4)
   b. Which passes through the points (4,-4) and (-2,7)

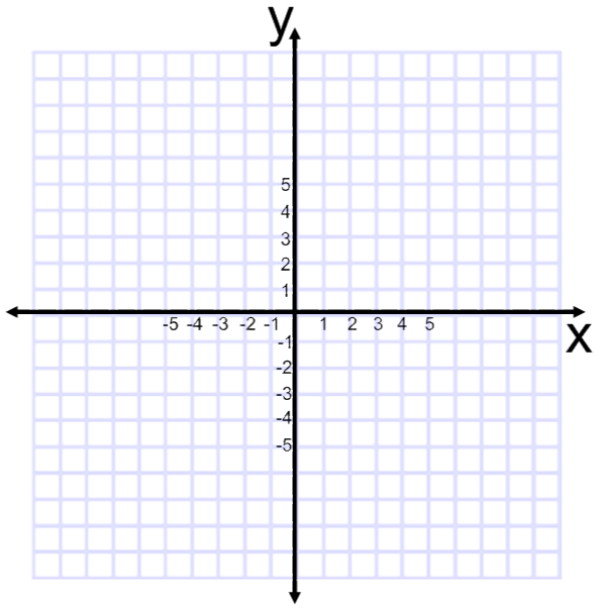
7. Express each of the following as composites of two or more functions:
   a. $7x-2$ b. $\frac{18}{\sqrt{x^2-3}}$

8. Show that *f*(x) and *g*(x) are inverses of each other using compositions. $f(x)=\sqrt{2x-3}$ and $g(x)=\frac{1}{2}x^2+\frac{3}{2}$

9. Graph:

a. $f(x)=\frac{-1}{2}(x+2)$

b. $f^{-1}(x)$



10. For each of the following, simplify the expression completely. (Remember to write down any restrictions.)

a. $\frac{5k^2-20k}{12+5k-2k^2}$

b. $\frac{5h^3}{h^2-h}$

11. Use the geometric definition of absolute value to find the solution set to the following.

a. $|x+3|=5$

b. $|5-4x|\le 6$

12. Perform the indicated operation(s) and simplify. (Do not forget to write the restrictions.)

a. $\dfrac{1-\frac{1}{1-x}}{4+\frac{3}{x^2-1}}$

b. $\dfrac{9-x^{-2}}{3x^{-1}-x^{-2}}$

c. $\frac{1}{3y}+\frac{y^2+1}{y^2-4y}+\frac{y-2}{36-9y}$

d. $\frac{a^2+2ab+b^2}{a^2-b^2}\div\frac{2a^2-ab-b^2}{a^2-ab-2b^2}$

e. $\frac{2y^2-y-15}{3y^2-y-10}\div\frac{y^2-10y+21}{9y^2-25}$

13. Solve each inequality and express the solution set in (a) set builder notation and (b) interval notation.

a. $x^2+9x+14<0$

b. $\frac{3x}{4}\le\frac{3x-6}{8}$

c. $\frac{x^2-3x-10}{(x-1)^2}>0$

14. Factor each of the following completely.

a. $28x^3 - 49x^2 + 21x$

b. $2x^3 + 3x^2 - 2x - 3$

c. $75x^2 - 3$

d. $8x^3 + 27$

e. $x^6 - 64y^3$

f. $x^4 - 6x^2 - 27$

15. For each of the following, find the axis of symmetry, vertex, any x-intercepts, any y-intercepts and its domain and range. Also state whether the vertex of each is a minimum or a maximum.

a. $f(x) = -x^2 - 2x + 8$

b. $f(x) = 2(x-1)^2 - 2$

c. $f(x) = -x^2 + 5x + 6$

d. $f(x) = 4x^2 + 12x + 6$

e. $f(x) = -3x^2 - 6x - 7$