AP Calculus Summer Review Homework

Name:_____

Please print this document off, and complete all of the problems on these pages. This homework will be due on the first day of class.

1) State the domain of each of the following functions. This is an algebraic question (ie no calculators necessary, so be sure to show all of your work.

a) $g(x) = \frac{x+5}{\sqrt{x^2-1}} - \sqrt{-x^2-2x+8}$

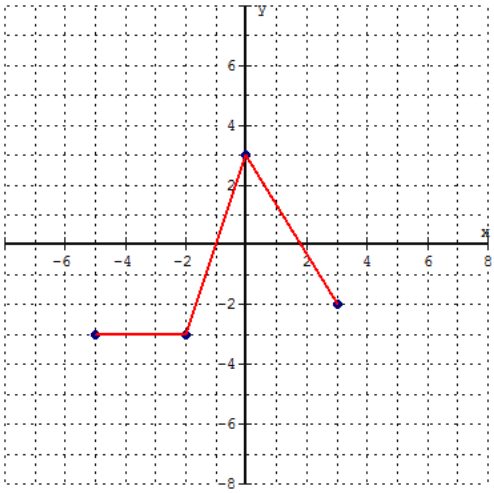
b) $f(x) = \frac{\ln(5x+2)}{x-6}$

2) Solve the following inequality for *x*. Again, this is an algebraic question (ie no calculators necessary, so be sure to show all of your work.

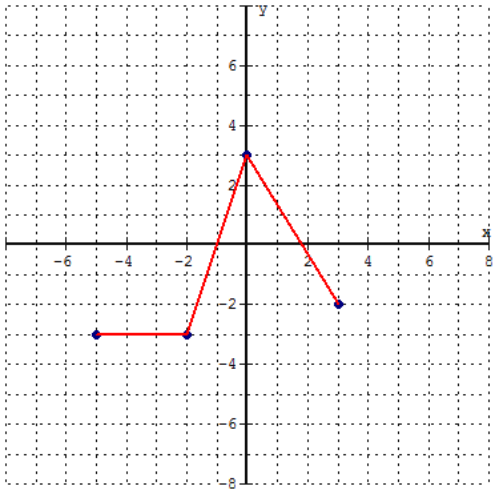
$$\frac{x^2-9}{-2x+4} \geq 0$$

3) Find the equation of the line perpendicular to $4x + 3y = 7$ that goes through the point (-8 , 4).

4) The diagrams below show the graph of a function $y = f(x)$. On each graph, sketch the transformed function indicated.



a) $y = -2f(x+3)+2$



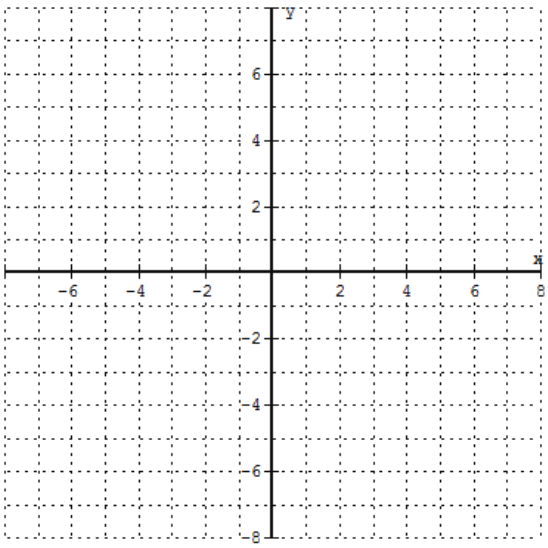
b) $y = f(2x)+3$

5) Given $g(x) = 3x^2 + 2x - 4$, find the average rate of change of $g(x)$ on each of the following intervals.

a) $x = 2$ to $x = 5$

b) $x = 1$ to $x = 1 + h$ (Simplify as much as possible.)

6) Sketch the graph of $g(x) = \dfrac{-2x^2 - 2x + 12}{x^2 - 9}$. Clearly indicate the equations of any asymptotes and the coordinates of any *x*-intercepts, *y*-intercepts, or holes.



7) Find a formula for the inverse function, $f^{-1}(x)$, of each of the following.

a) $f(x) = 4\ln(x - 3) + 5$

b) $f(x) = -2(3)^{x+1} - 5$

8) For what values of a will the system of equations given below have two solutions?

$$x^2 + (y - a)^2 = 36$$
$$x^2 + y^2 = 25$$

9) Evaluate each of the following limits. Describe how you came to your conclusion.

a) $\lim_{x\to-\infty} = 4x^4 - 5x^3 + 3x + 12$

b) $\lim_{x\to-\infty} \frac{5+3^x}{-2+3^X}$

c) $\lim_{x\to\infty} \frac{5+3^x}{-2+3^X}$

d) $\lim_{x\to3} \frac{x^2-6x+9}{6-2x}$

10) Given $f(x) = -2x^2 + 3$, evaluate the following limit **algebraically**.

$$\lim_{h\to0} \frac{f(2+h)-f(2)}{h}$$

11) Given $f(x) = 2^x$, evaluate the following limit using the table below. Round your answer to **three** decimal places.

$$\lim_{h\to0} \frac{f(1+h)-f(1)}{h} \approx$$

h	-0.1	-0.01	-0.001		0.001	0.01	0.1

12) Evaluate each of the following **exactly**. For the last two, you will need the angle addition formulas for sine and/or cosine.

a) $\cos\left(\frac{5\pi}{4}\right)$

b) $\sin\left(-\frac{7\pi}{3}\right)$

c) $\sin(75°)$

d) $\cos\left(\frac{7\pi}{12}\right)$

13) Evaluate each of the following.

a) $\cos\left(\sin^{-1}(x)\right)$

b) $\tan\left(\sin^{-1}(x)\right)$