

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

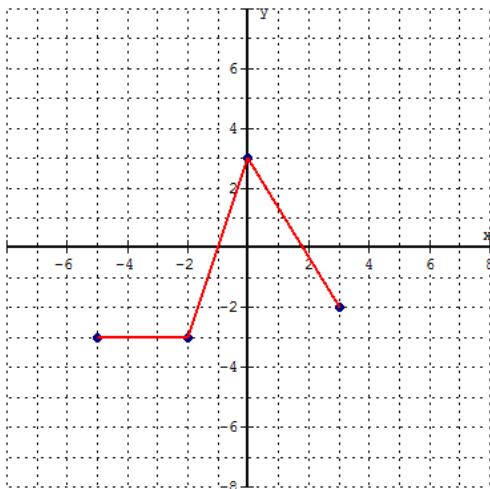
b) $f(x) = \frac{\ln(5x+2)}{x-6}$

- 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.

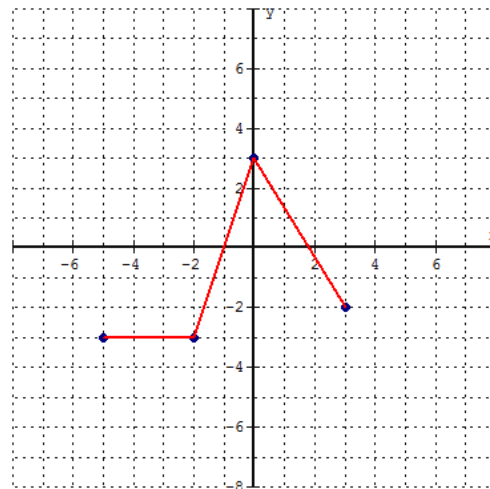
$$\frac{x^2-9}{-2x+4} \geq 0$$

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



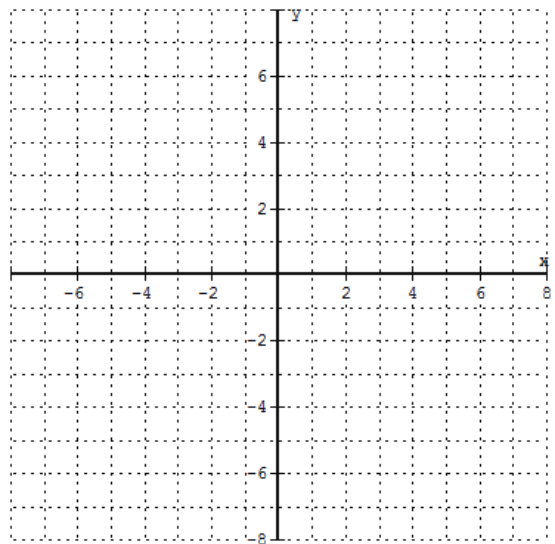
b) $y = f(2x) + 3$

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 $g(x) = \frac{-2x^2 - 2x + 12}{x^2 - 9}$. 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) $\lim_{x \rightarrow -\infty} = 4x^4 - 5x^3 + 3x + 12$

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

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

d) $\lim_{x \rightarrow 3} \frac{x^2 - 6x + 9}{6 - 2x}$

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

$$\lim_{h \rightarrow 0} \frac{f(2+h) - f(2)}{h}$$

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

$$\lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h} \approx$$

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) $\sin(75^\circ)$

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

13) Evaluate each of the following.

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

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