Lesson #80 HW Name:________________________________

L'Hopital's Rule

Assume that questions #1-8 are multiple-choice questions. Work must include appropriate limit notation.

1. $\lim_{x\to 2} \frac{x^2-4}{x^2+2x-8}$

2. $\lim_{x\to 0} \frac{sin3x}{tan5x}$

3. $\lim_{x\to 0} \frac{e^x-1}{sinx}$

4. $\lim_{t\to 0} \frac{te^t}{1-e^t}$

5. $\lim_{x\to \pi^+} \frac{sinx}{x-\pi}$

6. $\lim_{x\to 0^+} \frac{sinx}{x^2}$

7. $\lim_{x\to \infty} \frac{lnx}{x}$

8. $\lim_{x\to \infty} \frac{e^{3x}}{2x}$

Show the work necessary for questions #9-12 as if they were free response questions.

9.

$$\lim_{x\to \pi} \frac{3cosx + \sin(4x) + 3}{x^2 - \pi^2}$$

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10. Let f be a twice-differentiable function. Use the table below to answer question 10.

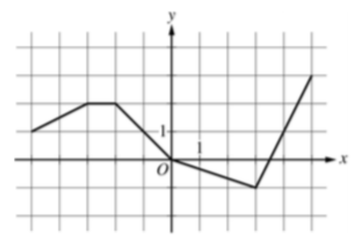
x	$f(x)$	$f'(x)$
2	4	-1
4	9	-2

a) $\lim_{x\to 2} \frac{f(x)-4}{x^3-8}$

b) $\lim_{x\to 4} \frac{\sqrt{f(x)}-3}{8x-2x^2}$

11. Consider the graph of function *h.* Use the graph to answer question 11.

$$\lim_{x\to -1} \frac{\sin\left(\frac{\pi}{2}x\right)-x}{1-(h(x))^2}$$



Graph of h

12. The functions f and g are twice-differentiable functions where $g(0) = 2$.
The function g satisfies $g(x) = \frac{\sin x}{(f(x))^4-16}$ for $x \neq 0$. It is known that $\lim_{x\to 0} g(x)$ can be evaluated using L'Hospital's Rule. Use $\lim_{x\to 0} g(x)$ to find $f(0)$ and $f\,'(0)$. Show the work that leads to your answers.