

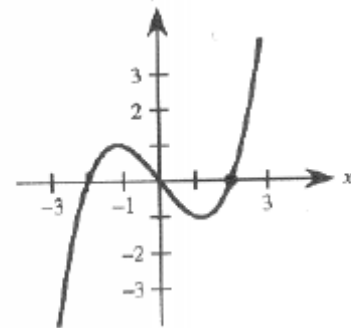
Name _____

Calculus Test #3 Review

1. If $f(x) = \begin{cases} \frac{9}{x^2} & \text{if } x \leq -3 \\ 4+x & \text{if } x > -3 \end{cases}$, then which of the following is false?

- a) $\lim_{x \rightarrow -3^-} f(x) = 1$
- b) $\lim_{x \rightarrow -3^+} f(x) = 1$
- c) $\lim_{x \rightarrow -3} f(x) = 1$
- d) $\lim_{x \rightarrow -3} f(x) \neq 1$

2. Label points A and B where the slope is zero. Put point C on the line where the slope is positive. Point D somewhere on the graph where the slope is negative. Describe the intervals in set notation where the function is increasing and decreasing.

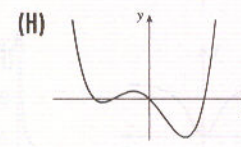
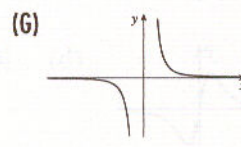
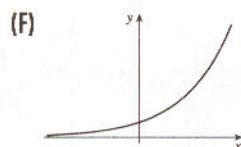
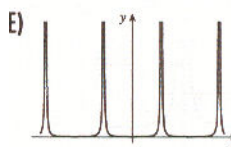
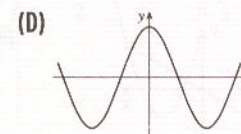
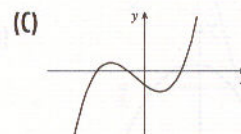
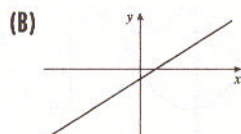
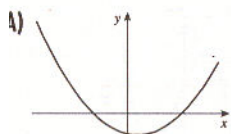
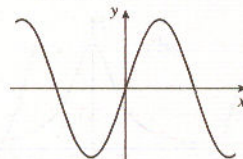


3. Use the definition of the derivative to evaluate the derivative of the function $f(x) = \frac{1}{x^2}$.

4. Use the alternative form of the derivative (*equation 1*) to find the derivative of $h(x) = \frac{1}{x}$ at $a = 3$.

5.

Given the graph of $y = f(x)$ below, select a graph which best represents the graph of $y = f'(x)$.



6. Identify the function represented by the following derivative:

$$\lim_{h \rightarrow 0} \frac{(6+h)^2 - 5(6+h) - 4 - 2}{h}$$

7. The table shows the relationship between pressure (in atmospheres) and volume (in liters) of hydrogen gas at 0°C .

Pressure (atm)	1	2	3	4	5	6
Volume (L)	22.4	11.2	7.5	5.6	4.5	3.7

Find the average rate of change of volume with respect to pressure for the interval $[3, 5]$. What would the units be?

8. Given the following information about limits, sketch a graph which could be the graph of $y = f(x)$. Label all horizontal and vertical asymptotes.

$$\lim_{x \rightarrow \infty} f(x) = \lim_{x \rightarrow -\infty} f(x) = 0, \quad \lim_{x \rightarrow 1} f(x) = \infty,$$

$$\lim_{x \rightarrow -1} f(x) = -\infty, \quad f(0) = 0.$$

Be able to write the equation of a line tangent to a function at a point.

Any question from your assignments would also be good review problems!

Know how to factor a trinomial without a calculator.

Be able to determine where a function is continuous or differentiable and be able to justify your answer with reasoning.
