

Name: _____

Calculus Practice Quiz #1

This quiz is to determine if you have mastered the material by attending tutoring sessions and completing your homework. Please write legibly and show as much work as possible for each problem.

1. Give a formal definition for the statement $\lim_{x \rightarrow c} f(x) = L$ in terms of ϵ and δ .

2. Use the above definition to find a suitable δ which proves each limit.

a. $\lim_{x \rightarrow -3} (5x^2 + 14x) = 3$

b. $\lim_{x \rightarrow -2} (2x^2 - 3x + 1) = 15$

3. Evaluate each of the following limits. (DO NOT USE L'HOPITAL'S RULE)

a. $\lim_{x \rightarrow 6} \frac{\frac{3}{x+3} + \frac{1}{3-x}}{x-6}$

b. $\lim_{x \rightarrow -2} \frac{3x^2 + 10x + 8}{x+2}$

c. $\lim_{x \rightarrow 0} \frac{(\sin 13x)(\sin 5x)}{x^2}$

d. $\lim_{x \rightarrow 0} \frac{x \sin x}{\cos^2 x - 1}$

e. $\lim_{x \rightarrow 0} \frac{3 - \sqrt{9 - x^2}}{x}$

f. $\lim_{x \rightarrow -3} \frac{x^2 + 5x + 6}{2x^2 + 3x - 9}$

4. Give the three conditions which define the state that $y = f(x)$ is continuous at $x = c$.

5. Examine each function for continuity on $(-\infty, \infty)$. If there is a discontinuity, identify which condition for continuity fails. Also, decide whether any discontinuity is removable or nonremovable. If there is a removable discontinuity, indicate how it can be removed.

a. $f(x) = \begin{cases} 2x^2 - 2, & x < 4 \\ \frac{7x+2}{x-3}, & x > 4 \end{cases}$

b. $f(x) = \begin{cases} 2x+7, & x < 1 \\ 3x^2 - 3x - 1, & x > 1 \\ 2, & x = 1 \end{cases}$