

Math 261 - Calculus I  
Los Angeles City College - Spring 2008

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Name \_\_\_\_\_

1. Find the limit: (10 pts.)

$$\lim_{x \rightarrow 2^-} \frac{x^3 - 5x^2 + 6x}{x^3 - 8}$$

2. Find the limit using the sandwich theorem: (5 pts.)

$$\lim_{x \rightarrow 0} x \cos\left(\frac{1}{x^2}\right)$$

3. Find the limit: (5 pts.)

$$\lim_{x \rightarrow -\infty} (2x - 6x^3)$$

4. Find the limit: (10 pts.)

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 - 1}}{2x + 1}$$

5. Find the limit: (10 pts.)

$$\lim_{x \rightarrow 0} \frac{3x - \sin 2x}{\tan x}$$

6. Find the limit: (10 pts.)

$$\lim_{x \rightarrow 1} \left(2 - \frac{5}{(x-1)^2}\right)$$

7. Prove the continuity of the following function: (10 pts.)

$$f(x) = \frac{x^3 - e^x}{\sqrt{2 - \sin x}}$$

8. Find a value for the constant "a" such that the following function will be continuous at x =

$$0 \text{ (10 pts.) } f(x) = \begin{cases} \frac{\sin 3x}{2x}, & x < 0 \\ a & x \geq 0 \end{cases}$$

9. For the following piecewise-defined function: (20 pts.)  $f(x) = \begin{cases} 1 - x^2 & x \leq 0 \\ 2x + 1 & 0 < x < 2 \\ 1 - 2x^3 & x > 2 \end{cases}$

a.  $\lim_{x \rightarrow 2^-} f(x)$

b.  $\lim_{x \rightarrow 2} f(x)$

c.  $\lim_{x \rightarrow -\infty} f(x)$

d.  $\lim_{x \rightarrow 0^-} f(x)$

e.  $\lim_{x \rightarrow 0} f(x)$

- f. Find the interval for  $f(x)$  to be a continuous function? Discuss the types of discontinuity (if any?).

g. Graph  $f(x)$

10. For  $f(x) = \frac{1-x^2}{1-2x}$  find all the asymptotes and sketch its graph (10 pts.)