

Evaluate the following limits. **Show your work.**

1.  $\lim_{x \rightarrow \infty} \left[ \ln \frac{2x+1}{x-1} \right] = \ln 2$

2.  $\lim_{x \rightarrow 0} \left[ \frac{\sin 5x}{3x} \right] = 5/3$

3.  $\lim_{x \rightarrow 25} \frac{\sqrt{x}-5}{x-25} = \frac{1}{10}$

4.  $\lim_{x \rightarrow -5^-} \frac{\sqrt{(x+5)^2}}{x+5} = -1$

5.  $\lim_{x \rightarrow +\infty} \left[ \frac{5-6x^4}{2x^2+4x+1} \right] = -\infty$

6.  $\lim_{x \rightarrow -1} \left[ \frac{x^4-1}{x+1} \right] = -4$

7.  $\lim_{x \rightarrow 2} \left[ \frac{x^2+x-6}{x+3} \right] = 0$

8.  $\lim_{x \rightarrow -\infty} (-105x^{27} + 54x^{13} - 75x^6 - 200) = +\infty$

9.  $\lim_{x \rightarrow 0} \left[ \frac{x}{(2+x)^{-1} - 2^{-1}} \right] = -4$

10. ~~Use L'Hop.~~

11.  $\lim_{x \rightarrow -1} [3x^4 - 2x + 10] = 15$

12.  $\lim_{x \rightarrow 3} \left[ \frac{x^3 - x^2 - 5x - 3}{x-3} \right] = 16$

13.  $\lim_{x \rightarrow -\infty} \sin \left[ \frac{5-2x^2}{x^4-2x^2+4} \right] = 0$

14.  $\lim_{x \rightarrow -\infty} [-50x^{103} + 122x^{54} + 10x^{21} - 1002] = +\infty$

15.  $\lim_{x \rightarrow -\infty} [5x + 2 - 3x^5] = +\infty$

16.  $\lim_{x \rightarrow -\infty} \left[ \frac{3x^4 - 2x + 10}{9x^4 + 6x - 30} \right] = \frac{1}{3}$

17.  $\lim_{x \rightarrow +\infty} \sqrt[3]{\frac{8x^7 - 4x^5 + 3x}{2x^7 - x^5 + 1}} = \sqrt[3]{4}$

18.  $\lim_{x \rightarrow +\infty} \left[ \frac{20x^{50} + 20x^{44} + 640}{10x^{44} + 6x^{25} - 320} \right] = +\infty$

19.  $\lim_{x \rightarrow -\infty} \left[ \frac{\sqrt{5x^2 - 4x}}{3x + 2} \right] = -\frac{\sqrt{5}}{3}$

20.  $\lim_{x \rightarrow -\infty} \left[ \frac{5-15x^7}{3x^3+10} \right] = -\infty$

21.  $\lim_{x \rightarrow +\infty} \frac{4x^2 + 5}{3x^2 + 2} = 4/3$

22.  $\lim_{x \rightarrow 0} \left[ \frac{\sin 4x}{3\sqrt{x}} \right] = \text{DNE}$

23.  $\lim_{x \rightarrow -\infty} \left[ \frac{5x^5 + 2x^2 + 6}{10x^7 + x^3 - 3} \right] = 0$

24.  $\lim_{x \rightarrow -2} \left[ \frac{3x^2 + x - 10}{x^3 + 8} \right] = -1/2$

25.  $\lim_{x \rightarrow 1} \left[ \frac{x}{x^2 - 1} \right] = -\infty$

26.  $\lim_{x \rightarrow 1} \frac{x^3 - 3x^2 + 2x}{x-1} = -1$

27.  $\lim_{x \rightarrow 0} \left[ \frac{\tan 2x}{\sin ax} \right] (a \neq 0) = \frac{2}{a}$

28.  $\lim_{x \rightarrow 3} \left[ \frac{x^2 + 2x - 3}{x^2 - 9} \right] = \text{DNE}$

29.  $\lim_{x \rightarrow 0} \left[ \frac{5x^4 + 3x^2 - 2x}{10x^5 - 8x^3 + 4x - 9} \right] = 0$

30.  $\lim_{x \rightarrow -5} \left[ \frac{x+5}{|x|+5} \right] = \frac{0}{10} = 0$

31.  $\lim_{x \rightarrow e} [1025468] = 1025468$

CHAPTER 2 - NO CALCULATOR  
REVIEW

NAME \_\_\_\_\_

HOUR \_\_\_\_\_

32. If  $f(x) = x^2 + 3x$  find  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$  Show your work.  **$2x+3$**

33.  $f(x) = \begin{cases} 5 - x^2, & x \leq 2 \\ 3x^2 - 4x - 3, & x > 2 \end{cases}$

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

$\lim_{x \rightarrow 0} f(x) = 5$

$\lim_{x \rightarrow 2} f(x) = 1$

34.  $\lim_{x \rightarrow 2} \frac{1 - \frac{4}{x^2}}{1 - \frac{2}{x}} = 2$

35. Find the discontinuities of  $f(x) = \frac{2}{2\pi - 3\cos^{-1}x} = -\frac{1}{2}$

36. Find the discontinuities of  $f(x) = \frac{1}{1 - 2\cos x}$ .  **$\pi/3 + 2\pi n, 5\pi/3 + 2\pi n$**

37. Find the values of  $x$  at which  $f(x) = \frac{x^3 + 27}{x^2 - 9}$  is not continuous and determine if they are removable discontinuities at those points.  **$-3 \downarrow 3$ , Removable @  $x = -3$**

38. What value of  $k$  will make  $g(x)$  continuous?  $g(x) = \begin{cases} \frac{x^3 + 5x^2 + x + 5}{x + 5}, & x \neq 5 \\ k, & x = 5 \end{cases}$  **26**

39. For the function  $f$  graphed in the accompanying figure, find

(a)  $\lim_{x \rightarrow -2} f(x) = \text{DNE}$

(b)  $\lim_{x \rightarrow -2^+} f(x) = -\infty$

(c)  $\lim_{x \rightarrow 0^-} f(x) = 0$

(d)  $\lim_{x \rightarrow 0^+} f(x) = -1$

(e)  $\lim_{x \rightarrow 2^-} f(x) = +\infty$

(f)  $\lim_{x \rightarrow 2^+} f(x) = 3$

