

Assignment 4-4

Find the indicated limits without using a calculator.

Hint: Not all problems will require the use of L' Hopital's Rule.

1. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x + 2}$
2. $\lim_{x \rightarrow 1} \frac{x^2 + 2x - 3}{x - 1}$
3. $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$
4. $\lim_{x \rightarrow 0} \frac{x}{x - (1 - e^x)}$
5. $\lim_{x \rightarrow 0^+} \frac{|x|}{x}$
6. $\lim_{x \rightarrow 0^-} \frac{|x|}{x}$
7. $\lim_{x \rightarrow 0} \frac{|x|}{x}$
8. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{\ln(x - 1)}$
9. $\lim_{x \rightarrow 0} \frac{2(e^x - 1)}{x^2}$
10. $\lim_{x \rightarrow \infty} \frac{2x^5 - x^2}{3x^5 + x^4 - 5x}$
11. $\lim_{x \rightarrow \infty} \frac{2x^4 - x^2}{3x^5 + x^4 - 5x}$
12. $\lim_{x \rightarrow \infty} \frac{e^x}{x^2}$
13. $\lim_{x \rightarrow \infty} \frac{3x^5 + x^4 - 5x}{2x^4 - x^2}$
14. $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2 + 5}}{x}$
15. $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 + 5}}{x}$
16. $\lim_{x \rightarrow 5} \frac{2x - 10}{5x}$
17. $\lim_{x \rightarrow 0} \frac{\tan x}{x \sec x}$
18. $\lim_{t \rightarrow \frac{\pi}{4}} \frac{\cos t - \sin t}{2 - 2 \tan t}$
19. $\lim_{\theta \rightarrow \frac{\pi}{2}} \frac{\sin(2\theta)}{\cos \theta}$
20. $\lim_{x \rightarrow 1} \frac{\arctan(x) - \frac{\pi}{4}}{x - 1}$
21. $\lim_{x \rightarrow 0^+} (e^x + x)^{\frac{3}{x}}$
22. $\lim_{x \rightarrow 0^+} (1 + x)^{\frac{1}{x}}$
23. $\lim_{x \rightarrow \infty} (2 + x)^{\frac{1}{x}}$
24. $\lim_{x \rightarrow 1^+} (\ln x)^{1-x}$

25. Use the concept of relative growth rate to evaluate the following.

a. $\lim_{x \rightarrow \infty} \frac{e^x - x}{x^2}$

b. $\lim_{x \rightarrow \infty} \frac{\ln x}{x}$

26. Use a calculator to find $\lim_{x \rightarrow 1.5} \frac{2x^3 - 3x^2 - 8x + 12}{6x^3 - 25x^2 + 34x - 15}$