



Name:

Date:

3E Exercises

L'Hôpital's Rule

Answer the following questions using the L'Hôpital's Rule

11. $\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3}$

13. $\lim_{x \rightarrow 0} \frac{\sqrt{25 - x^2} - 5}{x}$

15. $\lim_{x \rightarrow 0} \frac{e^x - (1 - x)}{x}$

16. $\lim_{x \rightarrow 1} \frac{\ln x^2}{x^2 - 1}$

21. $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x}$

23. $\lim_{x \rightarrow 0} \frac{\arcsin x}{x}$

30. $\lim_{x \rightarrow \infty} \frac{x^3}{e^{x^2}}$

51. $\lim_{x \rightarrow \infty} x^{1/x}$ (hint: set equal to y and take log)

59. $\lim_{x \rightarrow 2^+} \left(\frac{8}{x^2 - 4} - \frac{x}{x - 2} \right)$ (hint: Simplify expression)

CAPSTONE

88. Determine which of the following limits can be evaluated using L'Hôpital's Rule. Explain your reasoning. Do not evaluate the limit.

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

(b) $\lim_{x \rightarrow 0} \frac{x^2 - 4x}{2x - 1}$

(c) $\lim_{x \rightarrow \infty} \frac{x^3}{e^x}$

(d) $\lim_{x \rightarrow 3} \frac{e^{x^2} - e^9}{x - 3}$

(e) $\lim_{x \rightarrow 1} \frac{\cos \pi x}{\ln x}$

(f) $\lim_{x \rightarrow 1} \frac{1 + x(\ln x - 1)}{\ln x(x - 1)}$