

In Exercises 11–44, evaluate the limit, using L'Hôpital's Rule if necessary. (In Exercise 18, n is a positive integer.)

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

$$12. \lim_{x \rightarrow -1} \frac{x^2 - 2x - 3}{x + 1}$$

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

$$14. \lim_{x \rightarrow 5^-} \frac{\sqrt{25 - x^2}}{x - 5}$$



In Exercises 45–62, (a) describe the type of indeterminate form (if any) that is obtained by direct substitution. (b) Evaluate the limit, using L'Hôpital's Rule if necessary. (c) Use a graphing utility to graph the function and verify the result in part (b).

$$45. \lim_{x \rightarrow \infty} x \ln x$$

$$46. \lim_{x \rightarrow 0^+} x^3 \cot x$$

$$47. \lim_{x \rightarrow \infty} \left(x \sin \frac{1}{x} \right)$$

$$48. \lim_{x \rightarrow \infty} x \tan \frac{1}{x}$$

$$49. \lim_{x \rightarrow 0^+} x^{1/x}$$

$$50. \lim_{x \rightarrow 0^+} (e^x + x)^{2/x}$$

$$51. \lim_{x \rightarrow \infty} x^{1/x}$$

$$52. \lim_{x \rightarrow \infty} \left(1 + \frac{1}{x} \right)^x$$

$$53. \lim_{x \rightarrow 0^+} (1 + x)^{1/x}$$

$$54. \lim_{x \rightarrow \infty} (1 + x)^{1/x}$$

$$55. \lim_{x \rightarrow 0^+} [3(x)^{x/2}]$$

$$56. \lim_{x \rightarrow 4^+} [3(x - 4)]^{x-4}$$