Practice Exercise
Week #1 (part I)

The even-numbered problems are selected from the required textbook. The answers to these problems are given in a separate file. The link to the answers to next to the link to this file.

Section 1.1

For each sequence of numbers, determine the limit and then rewrite the sequence using the notation $x \to a^-$ or $x \to a^+$.

4. $-4.89, -4.899, -4.8999, -4.89999, \ldots$

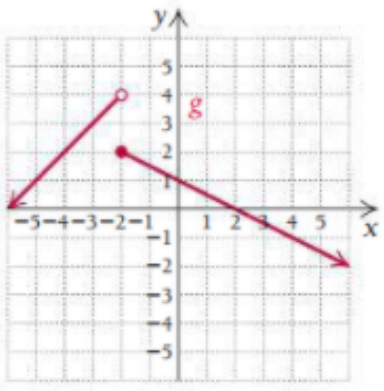
4. $-4.9, x \to -4.9^+$

8. $1.19, 1.199, 1.1999, 1.19999, \ldots$

8. $1.2, x \to 1.2^-$

Consider the function given by

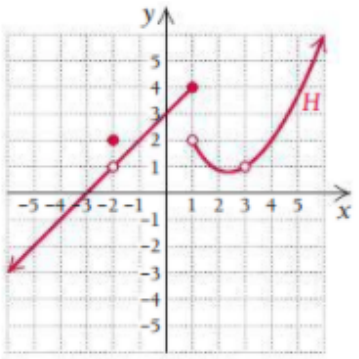
$$g(x) = \begin{cases} x + 6, & \text{for } x < -2, \\ -\frac{1}{2}x + 1, & \text{for } x \geq -2. \end{cases}$$



24. Find **(a)** $\lim_{x \to -2^-} g(x)$; **(b)** $\lim_{x \to -2^+} g(x)$; **(c)** $\lim_{x \to -2} g(x)$.

24. (a) 4; **(b)** 2; **(c)** does not exist

Use the following graph of H to find each limit. When necessary, state that the limit does not exist.



46. $\lim_{x \to 1^+} H(x)$

48. $\lim_{x \to 1} H(x)$

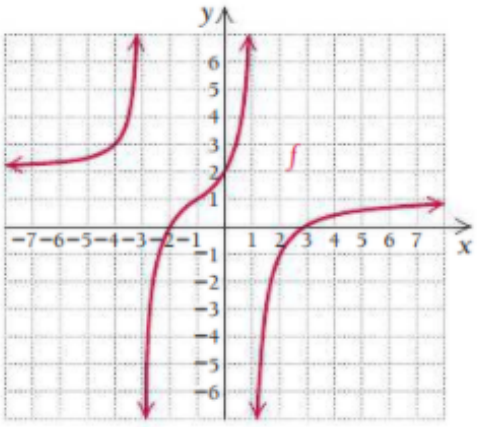
50. $\lim_{x \to 3} H(x)$

46. 2

48. Does not exist

50. 1

Use the following graph of f(x) to find each limit. When necessary, state that the limit does not exist.



52. $\lim_{x \to -1} f(x)$

54. $\lim_{x \to -3} f(x)$

56. $\lim_{x \to 3} f(x)$

58. $\lim_{x \to -4} f(x)$

60. $\lim_{x \to \infty} f(x)$

52. 1

54. Does not exist

56. 0

58. 3

60. 1

Section 1.2.

Use the Theorem on Limits of Rational Functions to find each limit. When necessary, state that the limit does not exist.

14. $\lim_{x \to 5} (x^2 - 6x + 9)$ **14. 4**

18. $\lim_{x \to 3} \frac{x^2 - 25}{x^2 - 5}$ **18. −4**

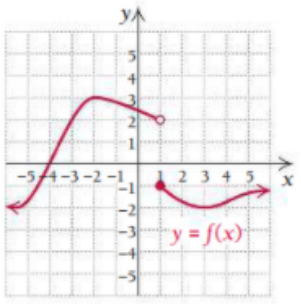
The initial substitution of x = a yields the form 0/0. Simplify the function algebraically or use a table or graph to determine the limit. When necessary, state that the limit does not exist.

20. $\lim_{x \to 3} \frac{x^2 - 9}{x - 3}$ **20. 6**

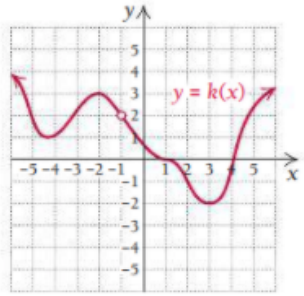
28. $\lim_{x \to 25} \frac{\sqrt{x} - 5}{x - 25}$ **28. $\frac{1}{10}$**

Determine whether each of the functions shown below is continuous over the interval (-6, 6)

48.



50.



48. Not continuous

50. Not continuous

68. Is the function given by

$$f(x) = \begin{cases} x^2 + x, & \text{for } x < 3, \\ 4x, & \text{for } x \geq 3, \end{cases}$$

continuous at $x = 3$? Why or why not?

68. Yes, the limit exists and equals the function value at 3.

72. Is the function given by

$$f(x) = \begin{cases} \dfrac{x^2 - 4x - 5}{x - 5}, & \text{for } x < 5, \\ x + 1, & \text{for } x \geq 5, \end{cases}$$

continuous at $x = 5$? Why or why not?

72. Yes, the limit exists and equals the function value at 5.

78. Is the function given by $F(x) = -\dfrac{2}{x-7}$ continuous over the interval $(-5, 5)$? Why or why not?

78. Yes, because $\lim_{x \to a} F(x) = F(a)$ for all a such that $-5 < a < 5$