Practice Exercise
Week #1 (part II)

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 1.2

82. Is the function given by $G(x) = \sqrt{9 - x^2}$ continuous over the interval $[-3, 3]$? Why or why not?

82. Yes, because $\lim_{x \to a} G(x) = G(a)$ for all a such that $-3 < a < 3$, and $\lim_{x \to -3^+} G(x) = G(-3)$ and $\lim_{x \to 3^-} G(x) = G(3)$

84. The Copy Shoppe charges \$0.08 per copy for quantities up to and including 100 copies. For quantities above 100, the charge is \$0.06 per copy. If x represents the number of copies, the price function is

$$p(x) = \begin{cases} 0.08x, & \text{for } x \leq 100, \\ 0.06x, & \text{for } x > 100. \end{cases}$$

Find $\lim_{x \to 100^-} p(x)$, $\lim_{x \to 100^+} p(x)$, and $\lim_{x \to 100} p(x)$.

84. 8, 6, does not exist

Section 1.3.

Find the average rate of change of the function based on the given values of x.

14. $G(x) = -3x^2, x_1 = -2, x_2 = 0$

14. 6

18. $g(x) = -x^2 + 4x, x_1 = -4, x_2 = 0$

18. 8

For each function, (a) find the simplified form of the difference quotient and then (b) complete the following table.

28. $f(x) = \frac{2}{x}$

28. (a) $-\frac{2}{x(x+h)}$; **(b)** $-\frac{2}{35}, -\frac{1}{15}, -\frac{4}{51}, -\frac{40}{501}$

36. $f(x) = x^2 + 4x - 3$

36. (a) $2x + h + 4$; **(b)** 16, 15, 14.1, 14.01

52. Total revenue. Suppose Fast Trends determines that the revenue, in dollars, from the sale of x iPod holders is given by

$$R(x) = -0.001x^2 + 150x.$$

Find $\frac{R(305) - R(300)}{305 - 300}$, and interpret the significance of this result to the company.

52. The average revenue from sales of between 300 and 305 holders is \$149.40 per unit.

56. Condor population. The condor population in the Grand Canyon in Arizona can be approximated by $P(t) = 2.8t^{1.87}$, where t is the number of years since 2000. (*Source*: Based on data from www.nps.gov.)

a) Find the average rate of change in this population between 2010 and 2017.

b) Find $\frac{P(15) - P(7)}{15 - 7}$. What does this number represent?

56. (a) 50.33; the population grew by about 50 condors per year between 2010 and 2017. **(b)** 42.064; the population increased by about 42 condors per year between 2007 and 2015.

62. Population change. The population of Payton County was 5400 at the last census and decreasing at the rate of 2.5% per year. The total population of the county after t years, $P(t)$, is given by

$$P(t) = 5400(0.975)^t.$$

Find $\dfrac{P(8) - P(5)}{8 - 5}$. What rate of change does this represent?

62. -116; Payton County lost an average of 116 people per year between the 5th and 8th years.