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?

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 $\lim_{x \to 100} p(x)$.

Section 1.3.

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

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

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

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

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

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

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

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

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?