Worksheet 6.5

Full Name: _____ Score: _____

1. Find the average value of the function on the given interval.

   (a) $f(x) = x^2 + x + 1$ on $[1, 3]$

   (b) $f(x) = \dfrac{1}{x}$ on $[1, e^2]$

   (c) $f(x) = \dfrac{2x}{(1 + x^2)^2}$ on $[0, 2]$

   (d) $f(t) = t \sin(t^2)$ on $[0, 10]$

2. The temperature in °C in a city t hours after 09:00 is modelled by the function

$$T(t) = 10 + 8\sin\left(\frac{\pi t}{12}\right).$$

Find the average temperature in that city in between 09:00 and 21:00.

3. A patient being treated for pulmonary fibrosis is tested with a spirometer to measure lung capacity. The data show the volume of air in the patient's lung during both the inhalation and exhalation cycles is given by

$$V(t) = 1 - \cos\left(\frac{2\pi t}{5}\right) \text{ pints}$$

over a period from $t = 0$ seconds till $t = 5$ seconds. Find the average volume of air in his lungs during this period. At what time(s) does this volume occur?