Name: _____ Sort #: _____

Worksheet 6

Applications of Integration MATH 2205, Fall 2018

1. Find the average value of the function $f(t) = e^{\sin(t)} \cos(t)$ on $[0, \frac{\pi}{2}]$.

For Problems 2 to 4: Write up the solutions to these problems using the GASCAP format (posted in the document on Canvas)

2. A spring has a natural length of 20 cm. If a 25-N force is required to keep it stretched to a length of 30 cm, how much work is required to stretch it from 20 cm to 25 cm? Round your final result to 3 decimal places.

3. A steady wind blows a kite due west. The kite's height above ground from horizontal position $x = 0$ to $x = 80$ ft is given by

$$y = 150 - \frac{1}{40}(x - 50)^2$$

Set up the integral needed to find the distance traveled by the kite. Use technology to evaluate this integral. Round the final result to two decimal places.

4. The velocity v of blood that flows in a blood vessel with radius R and length l at a distance r from the central axis is

$$v(r) = \frac{P}{4\eta l}(R^2 - r^2)$$

where P is the pressure difference between the ends of the vessel and η is the viscosity of the blood. Find the average velocity (with respect to r) over the interval $0 < r < R$.