Quiz 4

Name: _____

You will have 20 minutes ∘ Calculators are allowed ∘ Show all work for credit ∘ Don't cheat ∘ attempts at a problem may count for partial credit. ∘ If you get stuck, show as much work as possible.

1. [3 pts] Find the area between the x-axis and the graph of the function $\sin(x)$ between $x = 0$ and $x = 2\pi$.

2. Suppose the number of fish, f, in a pond grow according to the differential equation

$$\frac{df}{dt} = 7.7e^{0.1t},$$

where t is measured in months. Let's also suppose that there are 10 fish at time $t = 0$.

   (a) [3 pts] What is the total change in the number of fish in the first three months?

   (b) [1 pts] How many fish are there at this point in time?

3. [4 pts] Suppose the amount of energy (in Joules) a cell produces follows the equation

$$E(t) = \frac{2.5}{1+t}$$

over a time length of four milliseconds. Find the average energy produced by the cell during this time.

4. [4 pts] The number of beavers along the Willamette river has a density of

$$B(x) = 0.2(x-5)^2 + 1 \qquad \text{hundred beavers/mile,}$$

where x is the number of miles east along the river measured from Eugene. How many beavers live between one and five miles away (to the east) from Eugene along the river?