MA 138 Worksheet #2

Section 6.3
1/11/24

1 If $\frac{dN}{dt}$ represents the rate of change of population at time t, what does

$$\int_{13}^{42} \frac{dN}{dt} dt$$

represent?

2 The rate of growth of a fish is sometimes modeled by the equation $\frac{dL}{dt} = L_0 e^{-kt}$ where L is the length of the fish, and k and L_0 are positive constants. How does the length of a fish at $t = 0$ compare to at $t = 3$?

3 Consider the region enclosed by the curves $y = x$, $y = \frac{2}{x} - 1$, and the x-axis.

(a) Write the area of the enclosed region as an integral in terms of x.

(b) Write the area of the enclosed region as an integral in terms of y.

(c) Choose one of the integrals from above and evaluate it to compute the area of the enclosed region.

4 How does the formula for the average value of a function using integration relate to averaging distinct values?

5 Let $f(x) = \tan(x)$. Give a geometric argument to explain why the average value of $f(x)$ over $[-1, 1]$ is equal to 0.