Written Homework 3

Math 111

Due January 31th at the start of class

Textbook Exercises:

Section 2: 38, 40

Section 3: 2, 4, 6, 10, 12, 14, 16, 18, 19, 20, 24, 26

Exercise 1: Let $q(t) = 2t^2 - 20t + 48$.

a) Is $q(t)$ a quadratic function?

b) Compute the second difference between the points $(1, 30)$, $(2, 16)$, and $(3, 6)$.

c) What is the vertical axis intercept of q? What are the horizontal axis intercepts?

d) What is the vertex of q?

Exercise 2: The rate of change of a population undergoing *logistic* growth is given by $R(P) = kP(N - P)$. Here, P is the population at a certain time, N is the maximum possible population (called the *carrying capacity*), and k is a positive constant. Populations that grow logistically grow quickly when the population is large, but that growth slows down as the population approaches the carrying capacity.

a) Is $R(P)$ a quadratic function? Explain.

b) What are the mathematical and practical domains of R?

c) Find **and interpret** the vertex of R.