Written Homework 4

Math 111

Due February 14th at the start of class

Textbook Exercises:

Section 4: 2, 4, 6, 8, 10, 12, 14, 16, 18, 24, 26, 28, 30

Exercise 1: Let $f(t) = 2t + 1 + \dfrac{t^2}{t+2}$.

a) Write f as $\dfrac{p(t)}{q(t)}$ for polynomials p and q, thereby showing that f is a rational function.

b) What is the behavior of f as $t \longrightarrow \infty$? What about as $t \longrightarrow -\infty$?

c) What is the mathematical domain of f?

Exercise 2: When hearing a sound at some distance from the source, the perceived intensity of the sound is inversely proportional to the square of the distance from the source.

a) Write an equation for the function $I(d)$ that measures the intensity of the sound at a distance of d meters from the source. Your answer should contain an unknown constant.

b) At a distance of 10 meters from the source, the sound is 1000 Watts per square meter, or $\frac{W}{m^2}$. What will the intensity be at 500 meters away?

c) What is the mathematical domain of I? What is the practical domain?

d) $1000\frac{W}{m^2}$ is actually very, very loud. The threshold of pain — the loudest a sound can get before it starts to hurt — is $1\frac{W}{m^2}$. At what distance is the intensity equal to 1?