Hmwk: pg 303 # 1, 4, 5ac, 6ac, 7, 10ab, (13)

**Rates of Change and Rational Functions**

Example 1

Norbert, an avid sportsman, decides to canoe out to Math Island; the distance to this island is 2 km. Norbert can paddle his canoe at about 4m/s in calm water.

1. How long would it take Norbert to canoe out to the island and back in calm waters?

Express your answer in minutes and seconds. Hint: $t=\frac{d}{v}$.

1. On a windy day, there is a current slowing Norbert down on his way to the island and speeding him up on the trip back to shore. Do you think that the trip will take the same amount of time, more time or less time? Create a hypothesis.
2. When Norbert canoes while there is a moving current his speed gets decreased/increased by an amount vc. So the total travel time to the island and back is given by the equation:

$$t=\frac{2000}{4-v\_{c}}+\frac{2000}{4+v\_{c}}$$

Simplify the function and create a sketch.

1. In the context of the problem, why does the graph suggest that there is no value when vc is equal to 4m/s?
2. What is the total travel time in minutes if the speed of the current is 1m/s?
3. At what rate is the travel time, t, changing when the speed of the current is 1m/s?

Example 2

The function $C\left(t\right)=\frac{5t}{0.01t^{2}+3.3}$ describes the concentration of a drug in the blood stream over time. The medication was taken orally at t = 0 minutes. The concentration, C, is measured in micrograms per millilitre (μg/ mL) and time, t, is measured in minutes.

1. Create a sketch of the function; hint… you may need graphing technology to assist.
2. What is the concentration after 60 minutes?
3. Show that the maximum concentration occurs at t = 18.17 minutes by evaluating the IROC at that instant.
4. At what rate is the concentration changing from 30 minutes to 60 minutes?