Homework Due Thursday October 5

Read reread section 3.3 pages 102–120 several times.

1. Pages 116–120 2ab, 3, 6, 7 (This is tricky so don’t be shy about asking for help), 10ab, 11ab, 18, 19.

2. This exercise is in part a review of notation relating to functions. This will come up repeatedly in the future so is is worth getting right now. This should also throw some light on problem 3 on page 116. Let $f$ be the function $f(t) = t^3$.

   (a) Expand the expressions $f(a + h)$ and $f(a - h)$.
   
   (b) Compute and simplify the expressions

   $$Q_1 = \frac{f(a + h) - f(a - h)}{2h} \quad \text{and} \quad Q_2 = \frac{f(a + h) - f(a)}{h}.$$ 

   Both $Q_1$ and $Q_2$ are quotients $\frac{\Delta y}{\Delta t}$ that estimate $f'(a)$.

   (c) If $h = .1$ which is smaller $h$ or $h^2$? If $h = .01$ which is smaller $h$ or $h^2$? What is the general pattern here?

   (d) How do the formulas for $Q_1$ and $Q_2$ together with the observations above about the size of $h$ and $h^2$ help explain why $Q_1$ gives the better estimate for $f'(a)$?