

Homework Due Thursday October 5

Read reread section 3.3 pages 102–120 several times.

- Pages 116–120 2ab, 3, 6, 7(This is tricky so don't be shy about asking for help), 10ab, 11ab, 18, 19.
- This exercise is in part a review of notation relating to functions. This will come up repeatedly in the future so 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 $f'(a)$.

- 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?
- 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 $f'(a)$?

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