

Topic #13 (Math 31)

1. Goals (Section 4.1).
 - a. Related Rates
2. Recall derivative as rate of change.
3. Example of derivatives
 - a. If $V(t)$ is the volume. What is $V'(t)$. Meaning of negative, positive?
 - b. If $y(t)$ = distance from the home. It is negative or positive; meaning?
 - c. If $x(t)$ = distance from BCC. Changes perspective.
 - d. If $L(t)$ = height of water in container
 - e. If $A(t)$ is free space left in a container (which putting water into)
4. Related Rates
 - a. Identify the varying quantities by letters.
 - b. Write down an equation that relates the quantities
 - c. Differentiate implicitly with respect to time.
 - d. Plug in given information.
 - e. Solve for requested parameter.
 - f. Cautions!:
 - i. Sometimes finding the needed information requires looking back at the original equation (i.e. not the differentiated equation).
 - ii. Be careful on whether a derivative is positive or negative.
5. Problems:
 - a. Basic Examples:
 - i. Suppose $y = x^3$, where x and y are both functions of time t . If $x' = -1$ and $x = 2$, what is y'
 - ii. Section 4.1 (p. 350): #3
 - iii. Do with circle equation (and need to find y)
 - b. Example 4.1 (p. 342, with figure!)
 - c. Example 4.2 (p. 344, with figure!)
 - d. Section 4.1 (p. 350-351): From 5 to 30