Chapter 3. Differentiation

3.10 Related Rates

Example. Page 198 number 23.

Note. Related Rates Problem Strategy

We will follow this protocol when solving related rates problems:

Step 1. *Draw a picture and name the variables and constants.* Use *t* for time. Assume that all variables are differentiable functions of time.

Step 2. *Write down the numerical information* (in terms of the symbols you have chosen).

Step 3, *Write down what you are asked to find* (usually a rate, expressed as a derivative).

Step 4. *Write an equation that relates the variables.* You may have to combine two or more equations to get a single equation that relates the variable whose rate you want to the variables whose rates you know.

Step 5. *Differentiate with respect to t.* Then express the rate you want in terms of the rate and variables whose values you know.

Step 6. *Evaluate.* Use known values to find the unknown rate.

Example. Page 198 number 23 (again).

Examples. Page 197 number 6, Page 199 number 28, and Page 201 number 44.