

MATH 1420: WORKSHEET FOR SECTION 4.1
RELATED RATES

Here's some related rates problems to practice with. For all of these, the key part of the work is to figure out the relationship between the variables you are interested in. Good first steps are to draw a picture, and to identify what rates you are given and what rate you are trying to find.

Problem 1. *A circle's radius is increasing at a rate of 2 units per second. Determine the rate of change of the area when the radius is 10 units.*

Problem 2. *You and a friend leave the same coffee shop at the same time. You bike straight north, while they bike straight west. If you are traveling at a constant 16 mph and your friend is traveling at a constant 12 mph, at what rate is the distance between you changing after you've traveled 1 mile?*

Problem 3. *You are exactly 6 feet tall and are walking directly away from a 10 foot tall lamppost at a rate of 3 feet per second. As you walk, you see that the length of your shadow in front you is changing. What is the rate of change in the length of the shadow when you are 8 feet away from the lamppost?*

Problem 4. *Two airplanes are flying toward the same airport. Airplane A is approaching directly from the west, traveling at 400 mph. Airplane B is approaching directly from the south, traveling at 350 mph. At what rate is the distance between them decreasing when airplane A is 50 miles away and airplane B is 40 miles away from the airport?*