Math 1a. §4.1 Worksheet
Related Rates

Fall 2005

1. You are driving along a straight highway where the speed limit is 65 miles per hour. You pass a highway patrol car sitting 1000 feet from the highway on your left. Thirty-five seconds later, the highway patrolman checks his radar to see if you are speeding. His radar tells him that the distance between you and him is 3000 feet and that the distance between you and him is increasing at a rate of 95 feet per second. Since 95 feet per second equals approximately 64.77 miles per hour, the highway patrolman decides that you are not speeding. Is the highway patrolman's decision correct? How fast are you actually driving?

2. It is evening and a woman who is five and a half feet tall is standing by a 14-foot high street lamp on a cobbled road, waiting for her ride home from work. When she sees her husband pull her car up to the curb, she begins to walk away from the light at a rate of 4 feet per second. How fast is the length of her shadow changing?

3. A water tank has the shape of an inverted circular cone with base radius 6 feet and height 12 feet. If water is being pumped into the tank at a rate of 10 cubic feet per minute, find the rate at which the water level is rising when the water is 5 feet deep.

4. Scooby Doo and Shaggy are in the woods. Fred told them to look for monsters, but they're really looking for a snack. They come to a clearing, and out of the woods steps a wolfman! Shaggy tries to hide by climbing up a very tall tree at a rate of 4 ft/s. Ten feet from the base of the tree, Scooby tries to hide by digging a hole straight down at a rate of 3 ft/s. At what rate is the distance between Scooby and Shaggy changing after 10 seconds?