

**Homework S1**

1. Do problems 20, 21, and 24 on pages 180 and 181 of the text.
2. A streetlight is mounted at the top of a 15 ft. pole. A man 6 ft. tall walks away from the pole at a speed of 5 ft/sec in a straight path. How fast is the tip of his shadow's head moving when he is 40 feet from the pole?
3. Sand is being dumped onto a conical pile at a constant rate of 20 cubic feet per minute. The moisture content of the sand is such that the height of the pile is always 3 times the diameter of the pile. How fast is the height of pile increasing when it is 10 feet tall?
4. A rectangular swimming pool is 10 feet wide and 15 feet long and has a sloping bottom so that it is 8 feet deep at the deep end and 2 feet deep at the shallow end. It has just been emptied for its annual cleaning and is being refilled. When the water is 2 feet deep, the lifeguard notices that the depth of the water is increasing at a rate of 1 inch every two minutes. What is the rate at which water is being pumped into the pool (in cubic feet per minute)? Assuming that the pump produces a constant flow of water, how long will it take to fill the pool?

**Next Topics:**

- Section 4.16: Application of the mean value theorem to geometric properties of functions
- Section 4.18: Curve sketching
- Section 4.19: Using calculus to find extrema of functions
- The definition of the logarithm