

Name _____

Homework 17
Section 4.6

1. (4) After another nefarious meeting at Tommy's All-Night Diner and Evil-Plan Hatchery, Dennis the mad scientist and Craig the morally corrupt mathematician head off in different directions. They both leave at precisely the same time, with Dennis heading directly south and Craig driving due east. Dennis sets his cruise control, and travels at a constant 65 mi/hr; Craig, however, encounters traffic, and is constantly having to vary his speed. Precisely 3 hours after they left, Dennis is still traveling at the same speed, while Craig has covered 150 miles, and is traveling at exactly 60 mi/hr. At what rate is the distance between them changing 3 hours after they left the diner?

2. (4) A ladder which is 16 feet long is leaning against a wall. If the bottom of the ladder slides away from the base of the wall at 18 in/sec, at what rate is the top of the ladder moving when the bottom of the ladder is 12 feet from the wall?
Round to the nearest inch.

3. (6) A coffee filter in the shape of a right circular cone with a base radius of 6 cm and depth 10 cm contains water, which drips out through a hole at the bottom at a constant rate of 2 cm^3 per second. What is the rate of change of the water level when the depth is 8 cm?

4. (6) A train is moving west along a long straight track toward a station. An observer is located at a point 0.75 miles directly south of the train station. When the front of the train passes a point that the observer knows is exactly 2.5 miles from the station, he notes that he is having to turn at a rate of 0.08 radians per minute in order to keep his focus on the front of the train. How fast is the train travelling at that instant? Give your answer in miles per hour.



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observer