Worksheet 12/05 – Related Rates – MAT 3501 – Fall 2017

Note: Problems 1, 3, 5 are from Anton's Calculus textbook, problems 2 and 4 are courtesy of Prof. Grantcharov.

1. A meteor enters the Earth's atmosphere and burns up at a rate that, at each instant, is proportional to its surface area. Assuming that the meteor is always spherical, show that the radius decreases at a constant rate.

2. A runner on a circular track of radius 300 ft is running with constant speed and completes one lap in 2 minutes. If his car is parked 100 ft away form the entrance of the track, how fast is the distance to his car changing, when he is 400 ft away from it? What about 700 ft?

3. Coffee is poured at a uniform rate of 20 cm^3/s into a cup whose inside is shaped like a truncated cone (picture will be drawn on the board). If the upper and lower radii of the cup are 4cm and 2cm and the height of the cup is 6 cm, how fast will the coffee level be rising when the coffee is halfway up?

4. How many times in 24 hours the arms of a clock are perpendicular to each other?

5. On a clock the minute arm is 4in long and the hour arm is 3in long. How fast is the distance between the tips changing at 3 o'clock?