Worksheet 11/27 – Related Rates – MAT 3501 – Fall 2017

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. 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?

3. 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?

4. How many times in 24 hours are the two arms of a clock perpendicular to each other? Assume continuous motion for both arms.