1. A certain liquid is being poured onto the floor from a small bottle at a rate of 0.1 cm^3/s. The liquid pools on the floor in a cylindrical shape, 1 cm in depth. How fast is the radius of this pool increasing when the pool has radius 10 cm.

   The volume of a cylinder of base radius r and height h is $V = \pi r^2 h$.

2. The strength S of a radio signal depends on the distance r to the source according to the equation

$$S = \frac{5}{r^2}.$$

   A certain vehicle is directly moving away from the radio signal with a velocity of $20,000$. How fast is the signal strength decreasing when the vehicle is at a distance of $100,000$ from the source?

3. Bob stands 5 meters away from a flagpole holding onto a spool of wire. Rory decides to climb the flagpole holding onto the other end of the wire. Rory climbs at a rate of 0.2 meters per second and as he climbs, the wire remains taught. How fast is the wire being unspooled when Rory is 10 meters above the ground?

4. A circular lake containing 30 km^3 of water begins to dry up at a constant rate of 5 km^3/yr. If the lake has a constant depth of 1 km, how fast is it's radius decreasing after 3 years?