RELATED RATES

1. A 40-foot ladder leans against a wall, with its base sliding away from the wall at 2 feet/min. How fast is the height of the ladder changing when the base is 24 feet from the wall?

2. When a spherical balloon is inflated, its radius increases by 3 cm/s. At what rate is the volume changing when the surface area is 100π cm^2?

3. How fast is the slope of the tangent line to $y = \frac{4}{2+5x}$ changing when $x = 2$ if x is increasing by 0.5 units/s?

4. Sand is filled into a large cone with radius 5m and height 10m to form a small cone of sand. If sand is filled at a rate of $10\text{m}^3/\text{s}$, at what rate is the sand's radius increasing when it is 2m?

5. A man 1.8m tall walks with speed 2m/s away from a streetlight. If the streetlight sits atop a 6m pole, how fast is the tip of the man's shadow moving along the ground?