

## 4.3 – Related Rates, Part II

1. An aircraft is flying horizontally at a constant height of 1 mile above an observation tower. The aircraft has already flown over the tower and is moving away from it. At a certain instant, the angle of elevation between an observer in the tower and the aircraft is  $60^\circ$  and the speed of the aircraft is 300 mph. How fast is the angle of elevation decreasing at this instant?

2. A TV station sets up sophisticated video equipment 6 km away from the NASA launch site in Houston, TX. The equipment is designed to focus on the shuttle and then follow its flight as it is launched into the atmosphere. At a certain moment, the angle  $\theta$  between the video equipment and the ground is  $\pi / 3$  radians and is changing at a rate of 0.9 rad/min. What is the velocity of the shuttle at that moment?

3. A man of height 1.8 m walks away from a 5-m lamppost at a speed of 1.2 m/s. How fast is the length of his shadow moving when he is 10 m from the lamppost?

4. As a woman walks away from a 250-cm lamppost, the tip of her shadow moves twice as fast as she does. How tall is the woman?