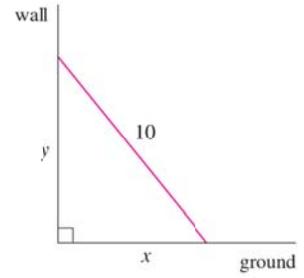


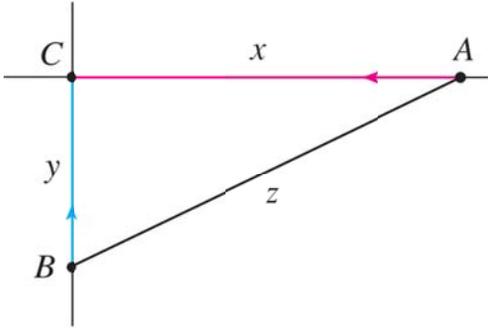
## Worksheet 5: Related Rates Problems

1. A ladder 10 ft long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 1 ft/s, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is 6 ft from the wall? [Stewart example 2.]



2. A water tank has the shape of an inverted circular cone with base radius 2 m and height 4 m. If water is being pumped into the tank at a rate of 2 m<sup>3</sup>/min, find the rate at which the water level is rising when the water is 3 m deep. [Stewart example 3. Inverted means point downward. The base of the cone is then the circle making the top of the cone. As a first step, draw a figure showing the water tank and relevant information.]

3. Car  $A$  is traveling west at 50 mi/h and car  $B$  is traveling north at north at 60 mi/hr. Both are headed for the intersection of the two roads. At what rate are the cars approaching each other when car  $A$  is 0.3 mi and car  $B$  is 0.4 mi from the intersection? [Stewart example 4. ]



4. A radar installation tracks an aircraft as illustrated in the figure. The aircraft is flying due east on a straight line at a constant altitude of 26,000 feet. The radar installation is 6 miles away from the ground track of the aircraft. (The ground track consists of the points on the ground directly below the aircraft). At one point of time, the radar detects that the aircraft is 11.15 miles away and at the same time the distance is decreasing at 395 miles per hour. How fast is the aircraft traveling along its path? (Do not assume the aircraft flies at constant speed.)

