

## Related Rates

- (1) A water trough is 10 m long and has a cross-section that is the shape of an isosceles trapezoid that is 30 cm at the bottom, 80 cm at the top and has a height of 50 cm. If the trough is being filled with water at a rate of 0.2 cu. m/min, how fast is the water level rising when the water is 30 cm deep?
- (2) A lighthouse is on a small island 3 km away from a straight shoreline and its light makes four revolutions per minute. How fast is the beam of light moving along the shoreline when the light is 1 km away from the point on the shoreline nearest to the light.
- (3) Two carts A and B are connected by a rope that's 39 ft long and passes over a pulley. The point Q is on the ground 12 ft directly below the pulley and between the carts. Cart A is being pulled away from Q at 2 ft/s. How fast is cart B moving towards Q at the instant when cart A is 5 ft from Q?
- (4) A plane flying with a constant speed of 300 km/h passes over a ground radar station at an altitude of 1 km and climbs at an angle of 30 degrees. At what rate is the distance from the plane to the radar station increasing 1 min later.
- (5) Two sides of a triangle have lengths 12 m and 15 m. The angle between them is increasing at 2 degrees/min. How fast is the length of the third side increasing when the angle between the sides of fixed length is 60 degrees.
- (6) Problem 45 in Section 3.11.