

Exercise 1. Two sides of a triangle are 4 m and 5 m in length and the angle between them is increasing at a rate of 0.06 rad/s. Find the rate at which the area is increasing when the angle between the sides of fixed length is $\pi/3$.

Exercise 2. A trough is 10 ft long and its ends have the shape of isosceles triangles that are 3 ft across at the top and have a height of 1 ft. If the trough is being filled with water at a rate of $12 \text{ ft}^3/\text{min}$, how fast is the water level rising when the water is 6 inches deep?

Exercise 3. The base of a rectangle is increasing at 4 cm/s while its height is decreasing at 3 cm/s. At what rate is the area changing when its base is 20 cm and its height is 12 cm?

Exercise 4. At noon, ship A is 100 km west of ship B. Ship A is sailing south at 35 km/h and ship B is sailing north at 25 km/h. How fast is the distance between the ships changing at 4:00 P.M.?