

WORKSHEET: RELATED RATES

1. A rectangular bathtub has a base of 18 ft^2 . At what rate is water pouring into the tub if the water level rises at a rate of 0.5 ft/min ?
2. A helicopter starting on the ground is rising directly into the air at a rate of 25 ft/s . You are running on the ground starting directly under the helicopter at a rate of 10 ft/s . Find the rate of change of the distance between you and the helicopter after 5 s .
3. A man of height 1.8 m walks away from a 5.4 m lamppost at a speed of 1.2 m/s . At what rate is the length of his shadow changing?
4. A hot air balloon rising vertically is tracked by an observer located 4 km from the liftoff point. At a certain moment, the angle between the observer's line of sight and the horizontal is $\pi/4$, and it is changing at a rate of 0.2 rad/min . How fast is the balloon rising at this moment?
5. At a given moment, a plane passes directly above a radar station at an altitude of 6 km , going at a speed of 15 km/min . How fast is the distance between the plane and the station changing at the instant when the plane passes directly above the radar station?
6. A jogger jogs around a circular track of radius 50 m . In a coordinate system with its origin at the center of the track, her x -coordinate is changing at a rate of $-5/4 \text{ m/s}$ when her coordinates are $(40, 30)$. At what rate is her y -coordinate changing?