

NAME _____

1. What is the first time after three o'clock that the two hands of a clock are pointing in the same direction?
2. Water runs into a conical tank at the rate of $9 \text{ m}^3/\text{hr}$. The tank stands point down and has a height of 10 m and a base radius of 5 m. How fast is the water level rising when the water is 6 m deep?
3. The volume of a cube is increasing at a rate of 3 centimeters per minute. How fast is the diameter (the farthest distance between any two vertices) increasing when the edge length is 7 centimeters?
4. The altitude of a triangle is increasing at a rate of 1 cm/min while the area of the triangle is increasing at a rate of $2 \text{ cm}^2/\text{min}$. At what rate is the base of the triangle changing when the altitude is 10 cm and the area is $100 \text{ cm}^2/\text{min}$?
5. A 13 ft ladder is leaning against a house when its base starts to slide away. By the time the base is 12 ft from the house, the base is moving at the rate of 5 ft/sec. At what rate is the area of the triangle formed by the ladder, wall, and ground changing then?
6. Suppose that a drop of mist is a perfect sphere and that, through condensation, the drop picks up moisture at a rate proportional to its surface area. Show that under these conditions the radius of the drop increases at a constant rate.