

Name _____ **Calculus Review (Related Rates)**

1. As a balloon in the shape of a sphere is being blown up, the volume is increasing at the rate of 4 cubic inches per second. At what rate is the radius increasing when the radius is 1 inch?
2. The radius of a circle is increasing at the rate of 5 inches per minute. At what rate is the area increasing when the radius is 10 inches?
3. Sand is falling off a conveyor onto a conical pile at the rate of 15 cubic feet per minute. The diameter of the base of the cone is approximately twice the altitude. At what rate is the height of the pile changing when it is 10 feet high?
4. A point moves along the curve $y = 2x^2 + 1$ in such a way that the y value is decreasing at the rate of 2 units per second. At what rate is x changing when $x = 3/2$?
5. The volume of a cube is changing at the rate of 18 cubic centimeters per second. How fast is the edge of the cube expanding when each edge is 2 centimeters?

6. The formula for the volume of a tank is $V = \pi r^3$ where r is the radius of the tank. If water is flowing in at a rate of 15 cubic feet per minute, find the rate at which the radius is changing when the radius is 3 feet.
7. As a balloon in the shape of a sphere is being blown up, the radius is increasing $\frac{1}{\pi}$ inches per second. At what rate is the volume increasing when the radius is 1 inch?
8. A side of a square is increasing at the rate of 2 feet per minute. Find the rate at which the area is increasing when the side is 7 feet.
9. A 5 meter long ladder is leaning against the side of a house. The base of the ladder is pulled away from the house at a rate of 0.4 m/sec.
- Determine how fast the top of the ladder is descending when the base of the ladder is 3 meters from the house.
 - Determine the rate at which the angle between the top of the ladder and the house is changing when the ladder is 3 meters from the house.