

## SATPREP

### Assignment- Related Rates

Solve each related rate problem.

- 1) A crowd gathers around a movie star, forming a circle. The radius of the crowd increases at a rate of 6 ft/sec. How fast is the area taken up by the crowd increasing when the radius is 9 ft?
- 2) A hypothetical square grows so that the length of its diagonals are increasing at a rate of 6 m/min. How fast is the area of the square increasing when the diagonals are 15 m each?
- 3) A perfect cube shaped ice cube melts at a rate of  $64 \text{ mm}^3/\text{sec}$ . Assume that the block retains its cube shape as it melts. At what rate are the sides of the ice cube changing when the sides are 2 mm each?
- 4) A spherical balloon is deflated so that its radius decreases at a rate of 2 cm/sec. At what rate is the volume of the balloon changing when the radius is 7 cm?
- 5) A spherical snowball is rolled in fresh snow, causing it grow at a rate of  $36\pi \text{ in}^3/\text{sec}$ . How fast is the radius of the snowball increasing when the radius is 3 in?
- 6) A hypothetical cube grows so that the length of its sides are increasing at a rate of 4 m/min. How fast is the volume of the cube increasing when the sides are 4 m each?
- 7) A 5 ft tall person is walking away from a 19 ft tall lamppost at a rate of  $\frac{5}{x}$  ft/sec, where  $x$  is the distance from the person to the lamppost. Assume the scenario can be modeled with right triangles. At what rate is the length of the person's shadow changing when the person is 16 ft from the lamppost?
- 8) A 7 ft tall person is walking away from a 20 ft tall lamppost at a rate of 3 ft/sec. Assume the scenario can be modeled with right triangles. At what rate is the length of the person's shadow changing when the person is 17 ft from the lamppost?

## Answers to Assignment- Related Rates

1)  $108\pi$  ft<sup>2</sup>/sec

2) 90 m<sup>2</sup>/min

3)  $-\frac{16}{3}$  mm/sec

4)  $-392\pi$  cm<sup>3</sup>/sec

5) 1 in/sec

6) 192 m<sup>3</sup>/min

7)  $\frac{25}{224}$  ft/sec

8)  $\frac{21}{13}$  ft/sec

