Related Rates … Set 3

Related Rates

Solve each related rate problem.

1) A hypothetical square grows so that the length of its diagonals are increasing at a rate of 4 m/min. How fast is the area of the square increasing when the diagonals are 2 m each?

2) A crowd gathers around a movie star, forming a circle. The area taken up by the crowd increases at a rate of 49π ft²/sec. How fast is the radius of the crowd increasing when the radius is 2 ft?

3) A spherical balloon is deflated so that its radius decreases at a rate of 4 cm/sec. At what rate is the volume of the balloon changing when the radius is 7 cm?

Related Rates … Set 3

4) A 5 ft tall person is walking towards a 17 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 13 ft from the lamppost?

5) A crowd gathers around a movie star, forming a circle. The radius of the crowd increases at a rate of 3 ft/sec. How fast is the area taken up by the crowd increasing when the radius is 8 ft?

6) A spherical snowball melts at a rate of $\frac{32\pi}{3}$ in^3/sec. At what rate is the radius of the snowball changing when the radius is 2 in?

Related Rates … Set 3

7) A perfect cube shaped ice cube melts at a rate of 8 mm^3/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 6 mm each?

8) A hypothetical square shrinks so that the length of its diagonals are changing at a rate of −5 m/min. At what rate is the area of the square changing when the diagonals are 14 m each?

9) A spherical balloon is inflated so that its radius increases at a rate of 2 cm/sec. How fast is the volume of the balloon increasing when the radius is 3 cm?

Related Rates … Set 3

10) Water slowly evaporates from a circular shaped puddle. The radius of the puddle decreases at a rate of 3 in/hr. Assuming the puddle retains its circular shape, at what rate is the area of the puddle changing when the radius is 5 in?

11) A spherical snowball is rolled in fresh snow, causing it to grow so that its radius increases at a rate of 2 in/sec. How fast is the volume of the snowball increasing when the radius is 4 in?

12) Water leaking onto a floor forms a circular pool. The radius of the pool increases at a rate of 2 cm/min. How fast is the area of the pool increasing when the radius is 8 cm?

Related Rates … Set 3

13) Water slowly evaporates from a circular shaped puddle. The area of the puddle decreases at a rate of 4π in^2/hr. Assuming the puddle retains its circular shape, at what rate is the radius of the puddle changing when the radius is 7 in?

14) A spherical balloon is inflated at a rate of 36π cm^3/sec. How fast is the radius of the balloon increasing when the radius is 3 cm?

15) A conical paper cup is 10 cm tall with a radius of 10 cm. The cup is being filled with water so that the water level rises at a rate of 3 cm/sec. At what rate is water being poured into the cup when the water level is 4 cm?

Related Rates … Set 3

16) Oil spilling from a ruptured tanker spreads in a circle on the surface of the ocean. The area of the spill increases at a rate of 36π m²/min. How fast is the radius of the spill increasing when the radius is 3 m?

17) A spherical snowball melts so that its radius decreases at a rate of 4 in/sec. At what rate is the volume of the snowball changing when the radius is 9 in?

18) A conical paper cup is 10 cm tall with a radius of 10 cm. The bottom of the cup is punctured so that the water level goes down at a rate of 3 cm/sec. At what rate is the volume of water in the cup changing when the water level is 4 cm?