PRACTICE PROBLEM SET 12

Now try these problems on your own. The answers are in Chapter 21.

1. Oil spilled from a tanker spreads in a circle whose circumference increases at a rate of 40 ft/sec. How fast is the area of the spill increasing when the circumference of the circle is 100π ft?
2. A spherical balloon is inflating at a rate of 27π in^3/sec. How fast is the radius of the balloon increasing when the radius is 3 in?
3. Cars A and B leave a town at the same time. Car A heads due south at a rate of 80 km/hr and car B heads due west at a rate of 60 km/hr. How fast is the distance between the cars increasing after three hours?
4. A cylindrical tank with a radius of 6 meters is filling with fluid at a rate of 108π m^3/sec. How fast is the height increasing?
5. The sides of an equilateral triangle are increasing at the rate of 27 in/sec. How fast is the triangle's area increasing when the sides of the triangle are each 18 inches long?
6. An inverted conical container has a diameter of 42 in and a depth of 15 in. If water is flowing out of the vertex of the container at a rate of 35π in^3/sec, how fast is the depth of the water dropping when the height is 5 inches?
7. A boat is being pulled toward a dock by a rope attached to its bow through a pulley on the dock 7 feet above the bow. If the rope is hauled in at a rate of 4 ft/sec, how fast is the boat approaching the dock when 25 feet of rope is out?
8. A 6-foot-tall woman is walking at the rate of 4 ft/sec away from a street lamp that is 24 feet tall. How fast is the length of her shadow changing?
9. The voltage, V, in an electrical circuit is related to the current, I, and the resistance, R, by the equation $V = IR$. The current is decreasing at –4 amps/sec as the resistance increases at 20 ohms/sec. How fast is the voltage changing when the voltage is 100 volts and the current is 20 amps?
10. The minute hand of a clock is 6 inches long. Starting from noon, how fast is the area of the sector swept out by the minute hand increasing in in^2/min at any instant?

PRACTICE PROBLEM SET 12

Now try these problems on your own. The answers are in Chapter 21.

1. Oil spilled from a tanker spreads in a circle whose circumference increases at a rate of 40 ft/sec. How fast is the area of the spill increasing when the circumference of the circle is 100π ft? 2000 ft^2/s

2. A spherical balloon is inflating at a rate of 27π in^3/sec. How fast is the radius of the balloon increasing when the radius is 3 in? 3/4 in/s

3. Cars A and B leave a town at the same time. Car A heads due south at a rate of 80 km/hr and car B heads due west at a rate of 60 km/hr. How fast is the distance between the cars increasing after three hours? 100 km/hr

4. A cylindrical tank with a radius of 6 meters is filling with fluid at a rate of 108π m^3/sec. How fast is the height increasing? 3 m/s

5. The sides of an equilateral triangle are increasing at the rate of 27 in/sec. How fast is the triangle's area increasing when the sides of the triangle are each 18 inches long? $243\sqrt{3}$ in^2/s

6. An inverted conical container has a diameter of 42 in and a depth of 15 in. If water is flowing out of the vertex of the container at a rate of 35π in^3/sec, how fast is the depth of the water dropping when the height is 5 inches? $-5/7$ in/s

7. A boat is being pulled toward a dock by a rope attached to its bow through a pulley on the dock 7 feet above the bow. If the rope is hauled in at a rate of 4 ft/sec, how fast is the boat approaching the dock when 25 feet of rope is out? $-25/6$ ft/s

8. A 6-foot-tall woman is walking at the rate of 4 ft/sec away from a street lamp that is 24 feet tall. How fast is the length of her shadow changing? 4/3 ft/s

9. The voltage, V, in an electrical circuit is related to the current, I, and the resistance, R, by the equation $V = IR$. The current is decreasing at –4 amps/sec as the resistance increases at 20 ohms/sec. How fast is the voltage changing when the voltage is 100 volts and the current is 20 amps? 380 volts/s

10. The minute hand of a clock is 6 inches long. Starting from noon, how fast is the area of the sector swept out by the minute hand increasing in in^2/min at any instant? $\frac{3\pi}{5}$ in^2/min

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