AP Calculus Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Pd.\_

Related Rates Day 4 Application of Derivatives

1. Each side of a square is increasing at a rate of 6 cm/s. At what rate is the area of the square increasing when the area of the square is 16 cm?

Know: Equation: Substitution:

Find: Derivative:

When:

2. The length of a rectangle is increasing at a rate of 8 cm/s and its width is increasing at a rate of 3 cm/s. When the length is 20 cm and the width is 10 cm, how fast is the area of the rectangle increasing?

Know: Equation: Substitution:

Find: Derivative:

When:

3. A cylindrical tank with radius 5 m is being filled with water at a rate of 3 $m^{3}$/min. How fast is the height of the water increasing?

Know: Equation: Substitution:

Find: Derivative:

When:

4. The radius of a sphere is increasing at a rate of 4 mm/s. How fast is the volume increasing when the diameter is 80 mm?

Know: Equation: Substitution:

Find: Derivative:

When:

5. If a snowball melts so that its surface area decreases at a rate of 1 $cm^{2}$/min, find the rate at which the diameter decreases when the diameter is 10 cm.

Know: Equation: Substitution:

Find: Derivative:

When:

6. At noon, ship A is 150 km west of ship B. Ship A is sailing east at 35 km/h and ship B is sailing north at 25 km/h. How fast is the distance between the ships changing at 4:00 pm?

Know: Equation: Substitution:

Find: Derivative:

When:

AP Calculus Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Pd.\_

Related Rates Day 4 Application of Derivatives

7. Two cars start moving from the same point. One travels south at 60 km/h and the other travels west at 25 km/h. At what rate is the distance between the cars increasing two hours later?

Know: Equation: Substitution:

Find: Derivative:

When:

8. At noon, ship A is 100 km west of ship B. Ship A is sailing south at 35 km/h and ship B is sailing north at 25 km/h. How fast is the distance between the ships changing at 4:00 pm?

Know: Equation: Substitution:

Find: Derivative:

When:

9. Water is leaking out of an inverted conical tank at a rate of 10,000 $cm^{3}$/min at the same time that water is being pumped into the tank at a constant rate. The tank has height 6 m and the diameter at the top is 4 m. If the water level is rising at a rate of 20 cm/min when the height of the water is 2 m, find the rate at which water is being pumped into the tank.

Know: Equation: Substitution:

Find: Derivative:

When:

10. The top of a ladder slides down a vertical wall at a rate of 0.15 m/s. At the moment when the bottom of the ladder is 3 m from the wall, it slides away from the wall at a rate of 0.2 m/s. How long is the ladder?

Know: Equation: Substitution:

Find: Derivative:

When:

