1. (2 pts) Let
$$xy = 5$$
and let
$$\frac{dy}{dt} = 5$$
Find $\frac{dx}{dt}$ when $x = 5$.

_____

Answer(s) submitted:

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(incorrect)

2. (2 pts) Air is being pumped into a spherical balloon so that its volume increases at a rate of 50cm^3/s. How fast is the surface area of the balloon increasing when its radius is 6cm? Recall that a ball of radius r has volume $V = \frac{4}{3}\pi r^3$ and surface area $S = 4\pi r^2$.

_____

Answer(s) submitted:

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(incorrect)

3. (2 pts) Gravel is being dumped from a conveyor belt at a rate of 50 cubic feet per minute. It forms a pile in the shape of a right circular cone whose base diameter and height are always the same. How fast is the height of the pile increasing when the pile is 11 feet high? Recall that the volume of a right circular cone with height h and radius of the base r is given by $V = \frac{1}{3}\pi r^2 h$.

_____

Answer(s) submitted:

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(incorrect)

4. (2 pts) The altitude of a triangle is increasing at a rate of 3.000 centimeters/minute while the area of the triangle is increasing at a rate of 3.500 square centimeters/minute. At what rate is the base of the triangle changing when the altitude is 11.000 centimeters and the area is 86.000 square centimeters?

_____

Note: The "altitude" is the "height" of the triangle in the formula "Area=(1/2)*base*height". Draw yourself a general "representative" triangle and label the base one variable and the altitude (height) another variable. Note that to solve this problem you don't need to know how big nor what shape the triangle really is.

Answer(s) submitted:

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(incorrect)

5. (2 pts) A street light is at the top of a 15 ft tall pole. A woman 6 ft tall walks away from the pole with a speed of 8 ft/sec along a straight path. How fast is the tip of her shadow moving when she is 40 ft from the base of the pole?

_____

Answer(s) submitted:

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(incorrect)

6. (2 pts) Water is leaking out of an inverted conical tank at a rate of 11900.000 cubic centimeters per min at the same time that water is being pumped into the tank at a constant rate. The tank has height 10.000 meters and the diameter at the top is 3.000 meters. If the water level is rising at a rate of 23.000 centimeters per minute when the height of the water is 1.500 meters, find the rate at which water is being pumped into the tank in cubic centimeters per minute. _____

Answer(s) submitted:

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(incorrect)

7. (2 pts) When air expands adiabatically (without gaining or losing heat), its pressure P and volume V are related by the equation $PV^{1.4} = C$ where C is a constant. Suppose that at a certain instant the volume is 590 cubic centimeters and the pressure is 99 kPa and is decreasing at a rate of 11 kPa/minute. At what rate in cubic centimeters per minute is the volume increasing at this instant? _____

(Pa stands for Pascal – it is equivalent to one Newton/(meter squared); kPa is a kiloPascal or 1000 Pascals.)

Answer(s) submitted:

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(incorrect)