4.5 Solving Related Rates

Calculus   Name: _____

Pythagorean	Triangle	Cone	Sphere	Cylinder	Cylinder	Cube
$a^2 + b^2 = c^2$	$A = \dfrac{1}{2}bh$	$V = \dfrac{1}{3}\pi r^2 h$	$V = \dfrac{4}{3}\pi r^3$	$V = \pi r^2 h$	$A = 2\pi r^2 + 2\pi rh$	$V = s^3$

1. If $y^2 = x^2 - z^2$, find $\dfrac{dy}{dt}$ when $x = 5$, $y = 3$, $z = 4$, $\dfrac{dx}{dt} = -3$, and $\dfrac{dz}{dt} = -6$.

2. If $A = bh^2$, find $\dfrac{dA}{dt}$ when $A = -8$, $h = 2$, $\dfrac{db}{dt} = 1$, and $\dfrac{dh}{dt} = 3$.

3. A baseball diamond has the shape of a square with sides 90 feet long. A player is running from first to second base at a speed of 30 feet per second. Find the rate at which the distance from home plate is changing when the player is 30 feet from second base.

4. The area of a rectangle is increasing at a rate of 15 feet / minute. If the width is increasing at a rate of 2 feet / minute when the length is 4 feet and the width is 3 feet, find the rate of change of the length.

5. The base of a triangle is increasing at a constant rate of 0.4 cm/sec and the height is decreasing at 0.1 cm/sec. When the height is 3 cm and the base is 10 cm, at what rate is the area increasing or decreasing?

6. A fish is reeled in at a rate of 1 foot per second from a point 15 feet above the water. At what rate is the angle between the line and the water changing when there are 25 feet of line out?

Answers to 4.5 CA #2

| 1. $\frac{dy}{dt} = 3$ | 2. $\frac{dA}{dt} = -20$ | 3. 16.641 feet/sec | 4. $\frac{7}{3}$ feet / min | 5. Increasing by 0.1 cm² per sec | 6. $\frac{3}{100}$ radians/sec |