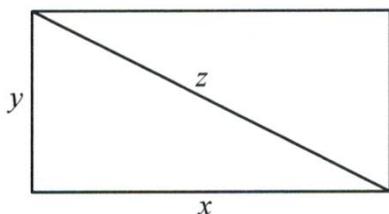


## Multiple Choice

### Non-Calculator

\_\_\_\_\_1. The volume of a cone of radius  $r$  and height  $h$  is given by  $V = \frac{1}{3}\pi r^2 h$ . If the radius and the height both increase at a constant rate of  $\frac{1}{2}$  centimeter per second, at what rate, in cubic centimeters per second, is the volume increasing when the height is 9 centimeters and the radius is 6 centimeters?

- (A)  $\frac{1}{2}\pi$                       (B)  $10\pi$                       (C)  $24\pi$                       (D)  $54\pi$                       (E)  $108\pi$



\_\_\_\_\_2. The sides of the rectangle above increase in such a way that  $\frac{dz}{dt} = 1$  and  $\frac{dx}{dt} = 3\frac{dy}{dt}$ . At the instant when  $x = 4$  and  $y = 3$ , what is the value of  $\frac{dx}{dt}$ ?

- (A)  $\frac{1}{3}$                       (B) 1                      (C) 2                      (D)  $\sqrt{5}$                       (E) 5

\_\_\_\_\_3. The top of a 25-foot ladder is sliding down a vertical wall at a constant rate of 3 feet per minute. When the top of the ladder is 7 feet from the ground what is the rate of change of the distance between the bottom of the ladder and the wall?

- (A)  $-\frac{7}{8}$  feet per minute                      (B)  $-\frac{7}{24}$  feet per minute  
(C)  $\frac{7}{24}$  feet per minute                      (D)  $\frac{7}{8}$  feet per minute  
(E)  $\frac{21}{25}$  feet per minute

\_\_\_\_\_4. If the base  $b$  of a triangle is increasing at a rate of 3 inches per minute while its height  $h$  is decreasing at a rate of 3 inches per minute, which of the following must be true about the area  $A$  of the triangle?

- (A)  $A$  is always increasing                      (B)  $A$  is always decreasing  
(C)  $A$  is decreasing only when  $b < h$                       (D)  $A$  is decreasing only when  $b > h$   
(E)  $A$  remains constant

