103-Rimmer Name_____

Hand-In HW #7 Recitation_____

**Fall 2011**

5. A 10 ft. long ladder rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 2 $\frac{\text{ft.}}{\text{s.}}$, how fast is the top of the ladder sliding when it is 2 ft. above the ground?

A) $-4\sqrt{3}\,\frac{\text{ft.}}{\text{s.}}$ B) $-2\sqrt{3}\,\frac{\text{ft.}}{\text{s.}}$ C) $-4\sqrt{2}\,\frac{\text{ft.}}{\text{s.}}$ D) $-8\sqrt{6}\,\frac{\text{ft.}}{\text{s.}}$

E) $-4\sqrt{6}\,\frac{\text{ft.}}{\text{s.}}$ F) $-2\,\frac{\text{ft.}}{\text{s.}}$ G) $-4\,\frac{\text{ft.}}{\text{s.}}$ H) $-2\sqrt{2}\,\frac{\text{ft.}}{\text{s.}}$

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**Spring 2011**

8. A woman 5 ft. tall is walking at a speed of 6 $\frac{\text{ft.}}{\text{sec.}}$ away from a streetlight which is mounted at a height of 20 ft. How fast is the tip of her shadow moving when she is 10 ft. from the light?

A) 4 $\frac{\text{ft.}}{\text{sec.}}$ B) 5 $\frac{\text{ft.}}{\text{sec.}}$ C) 6 $\frac{\text{ft.}}{\text{sec.}}$ D) 7 $\frac{\text{ft.}}{\text{sec.}}$

E) 8 $\frac{\text{ft.}}{\text{sec.}}$ F) 9 $\frac{\text{ft.}}{\text{sec.}}$ G) 10 $\frac{\text{ft.}}{\text{sec.}}$ H) 12 $\frac{\text{ft.}}{\text{sec.}}$

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**Fall 2010**

12. A particle is moving along the curve $y = x^2$. As the particle passes through the point (2,4), its $x$-coordinate increases at a rate of $2\ \frac{\text{cm.}}{\text{sec.}}$. How fast is the distance from the particle to the origin changing at this instant?

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**Spring 2010**

17. The base of a right triangle is increasing at a rate of 1 cm./sec. The height of the triangle stays constant at 4 cm. At what rate is the angle opposite the base changing when the triangle is isosceles?

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**Fall 2009**

11. Let $V$ be the volume of a cylinder having height $h$ and radius $r$, and assume that $h$ and $r$ vary with time. When the height is 5 in. and is increasing at 0.2 in./s. , the radius is 3 in. and is decreasing at 0.1 in./s. How fast is the volume changing at that instant?

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**Spring 2009**

4. The hypotenuse $AB$ of a right triangle $ABC$ remains constant at 5 feet as both legs are changing. One leg, $AC$ is decreasing at the rate of 2 feet per second. In order for the hypotenuse to remain 5 feet, the other leg $BC$ is increasing. The rate, in square feet per second, at which the **area** is changing when $AC = 3$ is

A) $\frac{25}{4}$ C) $\frac{7}{2}$ E) $\frac{-3}{2}$ G) $\frac{-7}{4}$

B) $\frac{3}{2}$ D) $\frac{-7}{2}$ F) $\frac{7}{4}$ H) None of these

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**Spring 2009**

15. Water is draining at the rate of $48\pi \ \text{ft.}^3/\text{sec.}$ from the vertex at the bottom of a conical tank whose diameter at its base is 40 feet and whose height is 60 feet.

(a) Find an expression for the volume of water in the tank in terms of its radius at the surface of the water.

(b) At what rate is the radius of the water in the tank shrinking when the radius is 16 feet?

(c) How fast is the height of water in the tank dropping at the instant that the radius is 16 feet?

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## Hand In HW #6 Answers

**Fall 2011 # 5: E**

**Spring 2011 # 8: E**

**Fall 2010 # 12:**

$$\frac{18\sqrt{5}}{5}\frac{\text{cm.}}{\text{s.}}$$

**Spring 2010 # 17:**

$$\frac{1}{8}\frac{\text{rad.}}{\text{s.}}$$

**Fall 2009 # 11:**

$$\frac{-6\pi}{5}\frac{\text{in.}^3}{\text{s.}}$$

**Spring 2009 # 4: G**

**Spring 2009 # 15:**

$$a)\ \pi r^3 \qquad b)\ \frac{1}{16}\frac{\text{ft.}}{\text{s.}} \qquad c)\ \frac{3}{16}\frac{\text{ft.}}{\text{s.}}$$