AP CALCULUS AB

QUIZ #4 STUDY GUIDE

1) Calculate the third derivative of

$$f(x) = \frac{x^7}{210} + \frac{x^6}{120} + \frac{x^5}{60}.$$

2) Calculate the second derivative of

$$f(x) = 9 \cdot \sqrt[6]{x^{11}} - \frac{7}{\sqrt[4]{x^9}}.$$

Express you answer in terms of radicals.

For problems **3** through **6**, calculate $f'(x)$ by expanding any squares first, and then by using the Product or Quotient Rule. Simplify your answers.

3)

$$f(x) = (3x + 8)(2x - 7)$$

4)

$$f(x) = \frac{3x + 8}{2x - 7}$$

5)

$$f(x) = (x + 5)^2(x + 6)$$

6)

$$f(x) = \frac{(x + 5)^2}{x + 6}$$

7) Frank tees off on a par – 3 hole. The initial upward velocity of the golf ball is 105 ft/sec. The ball then lands on the green, which is 60 ft below the tee. The height of the ball y, in ft, as function of time t, in sec, is

$$y = -16t^2 + 105t + 60\,.$$

Find

a) The maximum height of the ball (above the green).

b) The speed of the ball when it lands on the green.

For problem **8**, use the fact that

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

to calculate the indicated limits.

8) a)

$$\lim_{x \to 0} \frac{(1 + \cos x)}{x \cot x} = ?$$

b)

$$\lim_{x \to 0} \frac{\sec x}{x \csc x} = ?$$

For problems **9** through **12**, calculate $f'(x)$ by expanding any binomial products first, and then by using the Product Rule and/or Quotient Rule. Simplify your answers.

9)

$$f(x) = x^3 \csc x$$

10)

$$f(x) = \frac{\sec x}{x^3}$$

11)

$$f(x) = (3x + 8)(2x - 7)\cos x$$

12)

$$f(x) = \frac{(3x + 8)\sin x}{2x - 7}$$