

Math 171 - Quiz 5

September 27, 2012

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Let $f(x) = \sin x + x \cos x$.(a) Determine $f'(x)$.

$$f'(x) = \cos x + \cos x - x \sin x = \boxed{2 \cos x - x \sin x}$$

(b) Find an equation of the line tangent to the graph of f at the point where $x = 0$.

$$m = f'(0) = 2$$

$$\text{Point: } x = 0, y = f(0) = 0$$

$$\Rightarrow \boxed{y = 2x}$$

2. (2 points) If $f(x) = 5 \sec x$, find $f''(x)$.

$$f'(x) = 5 \sec x \tan x$$

$$\boxed{f''(x) = 5 \sec^3 x + 5 \sec x \tan^2 x}$$

3. (6 points) Determine each derivative.

$$(a) \frac{d}{dx} [x^2 \tan x] = \boxed{2x \tan x + x^2 \sec^2 x}$$

$$(b) \frac{d}{dr} \left[\frac{6r^7 - 8r^3 + r^2}{r^9 + 1} \right] = \frac{(r^9 + 1)(42r^6 - 24r^2 + 2r) - (6r^7 - 8r^3 + r^2)(9r^8)}{(r^9 + 1)^2}$$

$$(c) \frac{d}{dw} \left[\sqrt[7]{w^2} + \frac{9}{w^4} \right] = \frac{d}{dw} \left(w^{2/7} + 9w^{-4} \right) = \boxed{\frac{2}{7} w^{-5/7} - 36w^{-5}}$$