

Name Dylan Zwick (solutions) Date 5/28/09

Instructions: Please show all of your work as partial credit will be given where appropriate, and there may be no credit given for problems where there is no work shown. All answers should be completely simplified, unless otherwise stated.

NOTE – Quiz is continued on the other side of the page.

1. Find y' for the following functions. (Do NOT bother simplifying.)

(a) $y = \frac{\cos x - \sin x}{4 \tan x}$

$$y' = \frac{4 \tan x (-\sin x - \cos x) - (\cos x - \sin x)(4 \sec^2 x)}{16 \tan^2 x}$$

Answer 1(a): $y' = \frac{4 \tan x (-\sin x - \cos x) - 4 \sec^2 x (\cos x - \sin x)}{16 \tan^2 x}$

(b) $y = (\csc x + 2 \cot x)(x^{-4} + 2x^3 - 6x)$

$$y' = (\csc x + 2 \cot x) \cdot (-4x^{-5} + 6x^2 - 6) + (x^{-4} + 2x^3 - 6x) \cdot (-\csc x \cot x - 2 \csc^2 x)$$

Answer 1(b): $(\csc x + 2 \cot x)(-4x^{-5} + 6x^2 - 6) + (x^{-4} + 2x^3 - 6x)(-\csc x \cot x - 2 \csc^2 x)$

2. Find $D_x y$ for $y = \sin(3x^2)$ (Do not bother to simplify.)

$$y' = \cos(3x^2) \cdot 6x$$

Answer 2: $y' = 6x \cos(3x^2)$

3. Find $\frac{dy}{dx}$ for $y = \left(\frac{x^4 - 3x}{\sin x}\right)^2$ (Do not bother to simplify.)

$$\frac{dy}{dx} = 2 \left(\frac{x^4 - 3x}{\sin x} \right) \cdot \left(\frac{\sin(x)(4x^3 - 3) - (x^4 - 3x)\cos(x)}{\sin^2 x} \right)$$

Answer 3: $\frac{dy}{dx} = 2 \left(\frac{x^4 - 3x}{\sin x} \right) \left(\frac{\sin x (4x^3 - 3) - (x^4 - 3x)\cos x}{\sin^2 x} \right)$

4. Find $f''(x)$ for $f(x) = \frac{-3}{2x+1}$

$$f'(x) = \frac{(2x+1)(0) - (-3)(2)}{(2x+1)^2} = \frac{6}{(2x+1)^2}$$

$$f''(x) = \frac{(2x+1)^2(0) - 6(2(2x+1) \cdot 2)}{[(2x+1)^2]^2}$$

$$= \frac{-24(2x+1)}{(2x+1)^4} = \frac{-24}{(2x+1)^3}$$

Answer 4: $f''(x) = \frac{-24}{(2x+1)^3}$