Prof. Haiman | Math 1A—Calculus | Fall, 2006

Quiz 5 solutions—version B

Name _____ Student ID Number _____

1. Differentiate the following functions of x.

(a) $\tan^{-1}(x^5)$

$$\frac{5x^4}{1+x^{10}}$$

(b) $e^{4x-3}\cos(2x+3)$

$$4e^{4x-3}\cos(2x+3) - 2e^{4x-3}\sin(2x+3),$$

or equivalently

$$e^{4x-3}(4\cos(2x+3) - 2\sin(2x+3))$$

2. Find the points on the ellipse $x^2 - xy + y^2 = 12$ where the tangent line is horizontal.

Implicit differentiation gives

$$y' = \frac{y-2x}{2y-x}$$

so $y' = 0$ when $y = 2x$. Substitute $y = 2x$ into the equation of the ellipse to get $3x^2 = 12$, $x^2 = 4$, so $x = \pm 2$. Using $y = 2x$ again, find two solutions: $(2, 4)$ and $(-2, -4)$.