

Quiz 10

October 5, 2016

Show all work and circle your final answer.

1. Find $\frac{dy}{dx}(\sin(\cos x + x \tan x))$.

$$= \cos(\cos x + x \tan x) \frac{d}{dx} [\cos x + x \tan x]$$

$$= \boxed{\cos(\cos x + x \tan x) (-\sin x + \tan x + x \sec^2 x)}$$

2. Use implicit differentiation to find the slope of the tangent line to the circle $x^2 + y^2 = 25$ at the point $(3, 4)$.

$$\frac{d}{dx} [x^2 + y^2] = \frac{d}{dx} [25]$$

$$2x + 2y y' = 0$$

@ $(3, 4)$: $2(3) + 2(4)y' = 0$

$$\boxed{y' = -\frac{3}{4}}$$

3. Find $\frac{dy}{dx}$ if $(x - y)^2 = x + y - 1$.

$$\frac{d}{dx} [(x - y)^2] = \frac{d}{dx} [x + y - 1]$$

$$2(x - y) \frac{d}{dx} [x - y] = 1 + y'$$

$$2(x - y)(1 - y') = 1 + y'$$

$$2(x - y) - 2(x - y)y' = 1 + y'$$

$$2(x - y) - 1 = 2(x - y)y' + y'$$

$$2(x - y) - 1 = [2(x - y) + 1]y'$$

$$\boxed{y' = \frac{2x - 2y - 1}{2x - 2y + 1}}$$