

# Mathematics Department

## Math1411 - Worksheet # 3

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-Name: \_\_\_\_\_

Q<sub>1</sub> Find the derivative of the following functions.

①  $y = \cos^2\left(\frac{x}{2}\right) - \sin^2\left(\frac{x}{2}\right)$

②  $y = \tan x - x$

③  $y = \frac{\sin x}{1 + \cos x}$

Q<sub>2</sub> a) Find the slope of the curve  $f(x) = \sqrt{x+1}$  at the point  $(8, 3)$

b) Find the equation of the tangent line at the point  $(8, 3)$

Q<sub>3</sub> If the differential of the function  $f(x) = x^2 - x + 7$  when  $x$  changes from 2 to  $C$  is 6. Find  $C = ??$

Q<sub>4</sub> Find the slope of the curve  $xy + y = \tan x$  at  $x = 0$

Q5. Find the equation of normal to the curve  $y = x + \sin x \cos x$  at  $x = \frac{\pi}{2}$

Short answer - Worksheet #3.

Q1 ①  $\frac{dy}{dx} = -\sin x$

②  $\frac{dy}{dx} = \tan^2 x$

③  $\frac{dy}{dx} = \frac{1}{1+\cos x}$

Q2 a) slope =  $m = \frac{1}{6}$

b) Equation of tangent  $y = \frac{x}{6} + \frac{10}{6}$

Q3  $C = 4$

Q4  $\frac{dy}{dx} = \text{slope of curve at } (x=0) = 1$

Q5  $y' = 1 + \cos(2x)$

$y'(\frac{\pi}{2}) = \text{Zero} = \text{slope of tangent}$

→ Equation of tangent  $y = \frac{\pi}{2}$

→ Equation of Normal  $x = \frac{\pi}{2}$