

Mathematics Department

Math1411 - Worksheet # 3

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-Name: _____

Q₁ 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 $y = \frac{\sin x}{1 + \cos x}$

Q₂ 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)

Q₃ If the differential of the function $f(x) = x^2 - x + 7$ when x changes from 2 to C is 6. Find $C = ??$

Q₄ 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 $x = \frac{\pi}{2}$