

MATH 2301 CALCULUS - I

1. Find the derivatives of the Functions.

a) $F(x) = \tan^{-1}(\cos x)$

b) $g(x) = \ln x^2$.

c) $F(t) = \sin^{-1}(t)$.

(2) Find dy/dx by implicit differentiation and simplify if possible.

$$\tan x/y = x^2 + y^2.$$

(3) Find the derivative of the function $y = \sqrt{3x}$.

a) Using the definition of derivative (i.e. a limit)

b) Using differentiation rules

(4) a) Find the intervals of which 'F' is increasing or decreasing.

b) Find the local maximum and minimum values of 'F'

c) Find the intervals of concavity and the inflection points.

d) Find any horizontal or vertical asymptotes

$$f(x) = \frac{x}{x^2 + 9}$$

$$\text{Hint } f''(x) = \frac{2x(x^2 - 27)}{(x^2 + 9)^3}$$