

Collins Sarima Lennenda

19/sci01/034

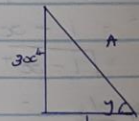
- Collins Sarima Lennenda  
MAT 201  
200 level

1) Find the differential of  $y = \tan^{-1} 3x^4$

$$y = \tan^{-1} 3x^4$$

$$y = \frac{3x^4}{\tan}$$

$$\tan y = 3x^4$$



using pythagorean theorem

$$(3x^4)^2 + 1^2 = A^2$$

$$9x^8 + 1 = A^2$$

$$A = \sqrt{1 + 9x^8}$$

$$\sec^2 y \frac{dy}{dx} = 12x^3$$

$$\frac{dy}{dx} = \frac{12x^3}{\sec^2 y}$$

$$\sec y = \frac{1}{\cos y}$$

$$\cos y = \frac{1}{\sqrt{9x^8 + 1}}$$

$$\sec y = \sqrt{1 + 9x^8}$$

$$\sec^2 y = 1 + 9x^8$$

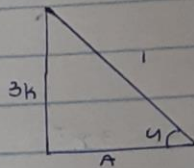
$$\frac{dy}{dx} = \frac{12x^3}{1 + 9x^8}$$

2 Find the derivative of  $u = \sin^{-1} 3k$

$$u = \sin^{-1} 3k$$

$$u = \frac{3k}{\sin}$$

$$\sin u = 3k$$



using pythagorean theorem

$$(3k)^2 + A^2 = 1^2$$

$$9k^2 + A^2 = 1$$

$$A^2 = 1 - 9k^2$$

$$A = \sqrt{1 - 9k^2}$$

$$\therefore \cos u \frac{du}{dk} = 3$$

$$\frac{du}{dk} = \frac{3}{\cos u}$$

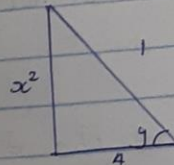
$$\cos u = \sqrt{1 - 9k^2}$$

$$\frac{du}{dk} = \frac{3}{\sqrt{1 - 9k^2}}$$

3) find the differential of  $\sin^{-1} x^2$

$$y = \frac{x^2}{\sin}$$

$$\sin y = x^2$$



using pythagorean theorem

$$(x^2)^2 + A^2 = 1^2$$

$$x^4 + A^2 = 1$$

$$A^2 = 1 - x^4$$

$$A = \sqrt{1 - x^4}$$

$$\cos y \frac{dy}{dx} = 2x$$

$$\frac{dy}{dx} = \frac{2x}{\cos y}$$

$$\cos y = \sqrt{1 - x^4}$$

$$\frac{dy}{dx} = \frac{2x}{\sqrt{1 - x^4}}$$