

Akpokimowo Gsetobare

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Computer Science

MA1201

1) Find the differential of $y = \arctan 3x^4$
solution

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

$$y = \frac{d}{dx} (\tan^{-1} (3x^4))$$

$$\frac{dy}{dx} [\tan^{-1} u] = \frac{u'}{1+u^2}$$

$$u = 3x^4$$

$$u' = 12x^3$$

$$\therefore \frac{d}{dx} (\tan^{-1} (3x^4)) = \frac{1}{1+(3x^4)^2} \times 12x^3$$
$$= \frac{12x^3}{1+9x^8}$$

2) ~~differentiate~~ derivative of

$$y = \arcsin 3x$$

solution

$$y = \sin^{-1} 3x$$

$$y = \frac{d}{dx} (\sin^{-1} (3x))$$

$$\frac{dy}{dx} [\sin^{-1} u] = \frac{u'}{\sqrt{1-u^2}}$$

$$u = 3x$$

$$u' = 3$$

$$= \frac{1}{\sqrt{1-(3x)^2}} \times 3$$

$$= \frac{3}{\sqrt{1-9x^2}}$$

3) Derivative of $y = \sin^{-1} \cos x$

Solution

$$y = \sin^{-1} \cos x$$

$$y = \frac{d}{dx} (\sin^{-1} \cos x)$$

$$\frac{dy}{dx} [\sin^{-1} u] = \frac{u'}{\sqrt{1-u^2}}$$

$$u = \cos x$$

$$u' = -\sin x$$

$$= \frac{-\sin x}{\sqrt{1-\cos^2 x}} \times (-\sin x)$$

$$= \frac{\sin^2 x}{\sqrt{1-\cos^2 x}}$$