UBAH CHIEMELIE
Computer science
19/SCI01/087

MAT 201

Assignment

1) $y = \arctan 3x^4$

$$\frac{dy}{dx} = \frac{d}{dx} \arctan 3x^4$$

let $u = 3x^4$

$$\therefore \frac{dy}{dx} = \frac{d}{dx} \arctan u$$

$$\therefore \frac{dy}{du} = \frac{1}{u^2+1}, \quad \frac{du}{dx} = 12x^3$$

Using the chain rule,

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$= \frac{1}{u^2+1} \cdot 12x^3$$

$$= \frac{12x^3}{u^2+1}$$

$$= \frac{12x^3}{(3x^4)^2+1}$$

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

$u = \arcsin 3k$

2.) ~~$\frac{dy}{dx} = \frac{d}{dx} \sin^{-1} 3x$~~

$$\frac{dy}{dk} = \frac{d}{dk} \sin^{-1} 3k$$

let $a = 3k$

So, $\frac{dy}{dk} = \frac{d}{dk} \sin^{-1} a$

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using the chain rule,

$$\frac{dy}{dk} = \frac{da}{dk} \cdot \frac{dy}{da}$$

$$= 3 \cdot \frac{1}{\sqrt{1-a^2}}$$

$$= 3 \cdot \frac{1}{\sqrt{1-(3k)^2}}$$

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

3.) $y = \arcsin x^2$

$$\frac{dy}{dx} = \frac{d}{dx} \arcsin x^2$$

let $u = x^2$

∴ So, $\frac{dy}{dx} = \frac{d}{dx} \arcsin u$

$$\frac{du}{dx} \cdot 2x \quad \frac{dy}{du} = \frac{1}{\sqrt{1-u^2}}$$

using chain rule,

$$\frac{dy}{dx} = \frac{du}{dx} \times \frac{dy}{du}$$

$$= 2x \cdot \frac{1}{\sqrt{1-u^2}}$$

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

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

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