PATUAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Group Assignment of MAT-111

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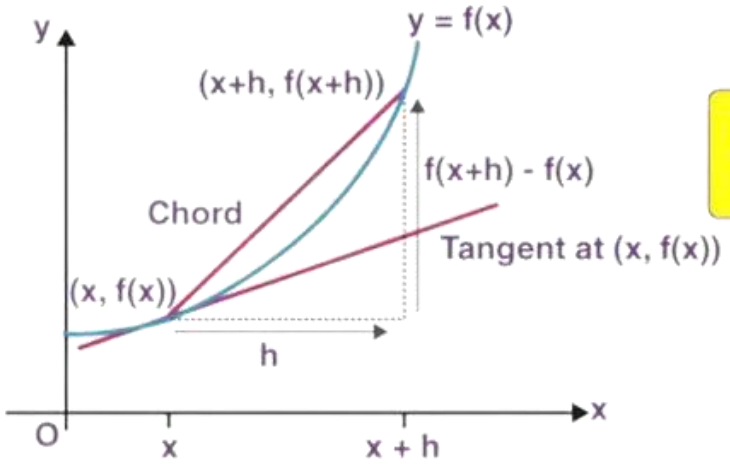
Derivative: Derivative is the rate of change of a function with respect to one of its variables.

If y=f(x);

then

$$\frac{dy}{dx} = \frac{d}{dx} f(x)$$



$$\frac{dy}{dx} = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$$

1)y=sin(log$x$)^2

$$\therefore \frac{d}{dx} y = \cos (\log x)^2 . \frac{d}{dx} (\log x)^2$$

$= \cos(\log x)^2 . 2\log x . \frac{d}{dx}(\log x)$

$= \cos(\log x)^2 . 2\log x . \frac{1}{x}$

2)y=tan(sinx.cosx) $sec^2(\sin x . \cos x) . \frac{d}{dx}$

$\therefore \frac{d}{dx} y = \frac{d}{dx}(\sin x . \cos x)$

$= sec^2(\sin x . \cos x) . \{(sinx . -sinx) + (cosx . cosx)\}$

$= sec^2(\sin x . \cos x) . (cos^2 x - sin^2 x)$

$= sec^2(\sin x . \cos x) . cos2x$

3)y=sin($cos^{-1}x$)

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

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

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

4)y=cosx . $e^{\log x}$

$\frac{dy}{dx} = \frac{d}{dx}(cosx . e^{logx})$

$\frac{dy}{dx}$=cosx $\frac{d}{dx}$ (e^{logx})+ e^{logx} $\frac{d}{dx}$ (cosx)

$\frac{dy}{dx}$ $= \cos x \cdot 1 + e^{\log x}(-\sin x)$

$\frac{dy}{dx}$=cosx - sinx . e^{logx}

5)y=$\tan^2 2x$ $\frac{dy}{dx}$= 2 tan2x .$\sec^2 x$ $\frac{dx}{dx}$

6)y=$\sin^{-1} x^2$

$= \frac{1}{\sqrt{1-(x^2)^2}}$ $\frac{dy}{dx}$ .2x $\frac{dx}{dx}$

$\frac{dy}{dx}$=√

$12-xx_4$

7)y=log(cosx)

Y1=$\frac{1}{cosx}$ $\frac{d}{dx}$.(cosx)

$= \frac{-sinx}{cosx}$

8)y=sin(ax+b)

$$Y1=\cos(ax+b).\frac{d}{dx}(ax+b)$$

$$=a.\cos(ax+b)$$

9)y=cos(ax+b)

$$Y1=-\sin(ax+b).\frac{d}{dx}(ax+b)$$

$$=-a.\sin(ax+b)$$

10. $y = e^{\sin x}$

$$\frac{dy}{dx} = e^{\sin x} \cos$$

11. $y = x^2 \tan x$

$$\frac{dy}{dx} = x^2 \sec^2 x + 2x \tan$$

12. $y = \sin x^2$

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

13. $Y = X^2 + 2X$

$$\frac{dy}{dx} = 2X + 2$$

14. $Y = X \ln X$

$$\frac{dy}{dx} = \frac{X}{X} + \ln X$$

$$= 1 + \ln X$$

15. $Y = \tan(\sin^{-1} X)$ $\frac{dy}{dx}$

$$= \frac{\sec(\sin^{-1} X)^2}{\frac{1}{\sqrt{1-x^2}}}$$

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

THE END