Differentiation Ex 11.2 Q6

Let,

$$y = e^{\tan x}$$

Differentiate it with respect to x,

$$\frac{dy}{dx} = \frac{d}{dx}\left(e^{\tan x}\right)$$

$$= e^{\tan x}\frac{d}{dx}\left(\tan x\right) \qquad\qquad \text{[Using chain rule]}$$

$$= e^{\tan x} \times \sec^2 x$$

So,

$$\frac{d}{dx}\left(e^{\tan x}\right) = \sec^2 x \times e^{\tan x}.$$

Differentiation Ex 11.2 Q7

Let,

$$y = \sin^2(2x + 1)$$

Differentiate it with respect to x,

$$\frac{dy}{dx} = \frac{d}{dx}\left[\sin^2(2x+1)\right]$$

$$= 2\sin(2x+1)\frac{d}{dx}\sin(2x+1) \qquad\qquad \text{[Using chain rule]}$$

$$= 2\sin(2x+1)\cos(2x+1)\frac{d}{dx}(2x+1) \qquad\qquad \text{[Using chain rule]}$$

$$= 4\sin(2x+1)\cos(2x+1)$$

$$= 2\sin 2(2x+1) \qquad\qquad \left[\text{Since, } \sin 2A = 2\sin A\cos A\right]$$

$$= 2\sin(4x+2)$$

So,

$$\frac{d}{dx}\left(\sin^2(2x+1)\right) = 2\sin(4x+2).$$

Differentiation Ex 11.2 Q8

Let,

$$y = \log_7(2x-3)$$

$$\Rightarrow \quad y = \frac{\log(2x-3)}{\log 7} \qquad\qquad \left[\text{Since, } \log_a b = \frac{\log b}{\log a}\right]$$

Differentiate it with respect to x,

$$\frac{dy}{dx} = \frac{1}{\log 7}\frac{d}{dx}\left(\log(2x-3)\right)$$

$$= \frac{1}{\log 7} \times \frac{1}{(2x-3)}\frac{d}{dx}(2x-3) \qquad\qquad \text{[Using chain rule]}$$

$$= \frac{2}{(2x-3)\log 7}$$

Hence,

$$\frac{d}{dx}\left(\log_7(2x-3)\right) = \frac{2}{(2x-3)\log 7}.$$

Differentiation Ex 11.2 Q9

Let,
$$y = \tan 5x°$$
$$\Rightarrow \quad y = \tan\left(5x° \times \frac{\pi}{180°}\right)$$

Differentiate with respect to x,

$$\frac{dy}{dx} = \frac{d}{dx}\tan\left(5x° \times \frac{\pi}{180°}\right)$$
$$= \sec^2 x\left(5x° \times \frac{\pi}{180°}\right)\frac{d}{dx}\left(5x° \frac{\pi}{180°}\right) \qquad [\text{Using chain rule}]$$
$$= \left(\frac{5\pi}{180°}\right)\sec^2\left(5x° \frac{\pi}{180°}\right)$$
$$= \frac{5\pi}{180°}\sec^2\left(5x°\right)$$

Hence,
$$\frac{d}{dx}\left(\tan\left(5x°\right)\right) = \frac{5\pi}{180°}\sec^2\left(5x°\right).$$

Differentiation Ex 11.2 Q10

Let,
$$y = 2^{x^3}$$

Differentiate with respect to x,

$$\frac{dy}{dx} = \frac{d}{dx}\left(2^{x^3}\right)$$
$$= 2^{x^3} \times \log_2 \frac{d}{dx}\left(x^3\right) \qquad [\text{Using chain rule}]$$
$$= 3x^2 \times 2^{x^3} \times \log_2$$

So,
$$\frac{d}{dx}\left(2^{x^3}\right) = 3x^2 \times 2^{x^3} \log_2.$$

********** END *********