

Ex 1 1

Q3

$$\text{Ans 3(b)} \int \frac{1}{(6x+7)^6} dx$$

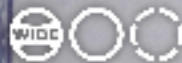
$$= \int (6x+7)^{-6} dx$$

using again above mention

$$= \frac{1}{6} \int (6x+7) (6) dx$$

$$= \frac{1}{6} \frac{(6x+7)^5}{5} + C$$

$$\int \frac{1}{(6x+7)} dx = \frac{1}{30} (6x+7)^5 + C$$



Q3

Ans 3Q $\int \frac{1}{\sqrt{x^3}} dx$

$$= \int \frac{1}{\sqrt{x^3}} \cdot \frac{1}{2} dx$$

$$= \int \frac{1}{2\sqrt{x^3}} dx$$

$$= \int x^{-3/2} dx$$

Using formula $\int x^m dx = \frac{x^{m+1}}{m+1} + C$

$$= \frac{x^{-3/2+1}}{-3/2+1} + C$$

$$= \frac{x^{-1/2}}{-1/2} + C$$

$$\int \frac{1}{\sqrt{x^3}} dx = -\frac{2}{\sqrt{x}} + C$$



Ex 1.1

$$\Rightarrow \frac{dy}{dx} = \frac{1}{2u} \times (-2)$$

$$\text{Use } u = \frac{1-x}{1+x}$$

$$\Rightarrow \frac{dy}{dx} = \frac{1}{2} \left[\frac{dx}{1-x} \right] \times \frac{(-1)}{(u^2)^2}$$

$$\boxed{\frac{dy}{dx} = \frac{-1}{1-x} (1+x)^{-3/2}}$$



Q2

Ans 2(b) $y = \sqrt{\frac{1-x}{1+x}}$

Let $u = \frac{1-x}{1+x}$ (i)

$$y = \sqrt{u}$$

$$1) \Rightarrow \frac{dy}{dx} = \frac{(1+x)(-1) - (1-x)}{(1+x)^2}$$

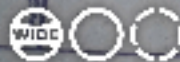
$$\frac{dy}{dx} = \frac{1-x-1+x}{(1+x)^2}$$

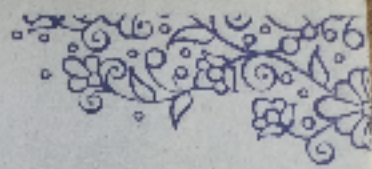
$$\frac{dy}{dx} = \frac{-2}{(1+x)^2}$$

$$2) \Rightarrow \frac{dy}{dx} = \frac{1}{2\sqrt{u}}$$

using chain rule

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





Q2

$$\text{Ans 2(a) } y = (1+2\sqrt{x})^3 x^{2/3}$$

$$\text{Let } x = u$$

$$y = (1+2\sqrt{u})^3 u^{2/3}$$

$$\frac{dy}{du} = (1+2\sqrt{u})^3 \cdot \frac{2}{3} u^{-1/3} + u^{2/3} \cdot 3(1+2\sqrt{u})^2 \cdot \frac{1}{2\sqrt{u}}$$

$$\frac{dy}{dx} = (1+2\sqrt{u})^3 \cdot \frac{2}{3} u^{-1/3} + 3u^{1/6} (1+2\sqrt{u})^2$$

$$\frac{dx}{du} = 1$$

using chain rule

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

$$= (1+2\sqrt{u})^2 \left[(1+2\sqrt{u}) \frac{2}{3} u^{-1/3} + 3u^{1/6} \right]$$

 $\times (1)$

$$\Rightarrow \frac{dy}{dx} = (1+2\sqrt{u})^2 \left\{ \frac{2}{3} (1+2\sqrt{u}) u^{-1/3} + 3u^{1/6} \right\}$$

$$\text{use } u = x$$

$$\Rightarrow \frac{dy}{dx} = (1+2\sqrt{x})^2 \left\{ \frac{2}{3} (1+2\sqrt{x}) x^{-1/3} + 3x^{1/6} \right\}$$

Ans 1(b) $\frac{(x^2+1)^2}{x^2-1}$

Use Quotient rule

$$= \frac{(x^2-1) \frac{d}{dx} (x^2+1)^2 - (x^2+1)^2 \frac{d}{dx} (x^2-1)}{(x^2-1)^2}$$

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

$$= \frac{2x(x^2+1)[2(x^2-1) - (x^2+1)]}{(x^2-1)^2}$$

$$= \frac{2x(x^2+1)[2x^2-2-x^2-1]}{(x^2-1)^2}$$

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

Q1 $2x^3 - 3x^2 + 5$

Ans $\frac{d}{dx} (2x^3 - 3x^2 + 5)$

using outoint rule.

$$= (x^2+1) \frac{d}{dx} (2x^3 - 3x^2 + 5) - (2x^3 - 3x^2 + 5) \frac{d}{dx} (x^2+1)$$

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

$$= (x^2+1) (6x^2 - 6x) - (2x^3 - 3x^2 + 5) (2x)$$

$$= 6x(x^2+1)(x-1) - (2x^3 - 3x^2 + 5) 2x$$

$$= 2x [3x(x^2+1)(x-1) - 2x^3 - 3x^2 + 5]$$

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