

Q13794

Q1, Ans:

A)

$$\frac{d}{dy} \left( \frac{3x^4 - 2x^3 + 5}{x^3 + 1} \right) = ?$$

$$= \frac{(3x^4 - 2x^3 + 5)' (x^3 + 1) - (x^3 + 1)' (3x^4 - 2x^3 + 5)}{x^3 + 1}$$

$$= \frac{(12x^3 - 6x^2) (x^3 + 1) - 3x^2 (3x^4 - 2x^3 + 5)}{x^3 + 1}$$

$$= \frac{12x^6 - 6x^5 + 12x^3 + 6x^2 - 9x^6 + 6x^5 - 15x^2}{x^3 + 1}$$

$$\text{Ans} = \frac{3x^6 + 12x^3 - 21x^2}{x^3 + 1}$$

B)

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

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

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

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

$$= \frac{6x^2(x^3+1) - 3x^2(x^3+1)'}{x^3-1}$$

$$x^3-1$$

Q2 :

A) integration.  $\int \frac{1}{\sqrt{x^5}} dx$

$$\int \frac{1}{\sqrt{x^5}} dx = \int \frac{1}{x^{5/2}} dx = \text{~~scribbles~~}$$

$$= \int x^{-5/2} dx = \frac{x^{-5/2}}{-5/2 + 1} + C$$

$$= \frac{x^{-5/2}}{\frac{-5+2}{2}} + C$$

$$= \frac{x^{-5/2}}{-3/2}$$

Q.2 - B)

Integration  $\int \frac{1}{(8x+7)^8} dx$

$$= \int (8x+7)^{-8} dx = (8x+7)^{-8+1} + C$$

$$= (8x+7)^{-7} + C$$

$$= \frac{1}{(8x+7)^7} + C$$

Q2) :- Ans :-

in integration  $\int \frac{-x+9}{2x^2-8x+6} dx$

$$= \int \frac{-x+9}{2x^2-8x+6} dx$$

$$\frac{-x+9}{2x^2-8x+6} = \frac{A}{x-4} + \frac{B}{x-2}$$

$$\frac{-x+9}{(x-4)(x-2)} = \left( \frac{A}{x-4} + \frac{B}{x-2} \right) |'$$

$$-x+9 = A(x-2) + B(x-4)$$

$$-2+9 = A(2-2) + B(2-4)$$

$$7 = 0 + (-2B)$$

$$7 = -2B$$

$$B = -\frac{7}{2}$$

$$-x+9 = A(x-2) + B(x-4)$$

$$-4+9 = A(4-2) + B(4-4)$$

$$5 = 2A$$

$$A = \frac{5}{2}$$

~~$$-x+9 = \frac{5}{2}(x-2) + \left(-\frac{7}{2}\right)(x-4)$$~~

$$= \int \frac{5}{2} \frac{1}{x-4} + \frac{7}{2} \frac{1}{x-2} dx = \frac{5}{2} \int \frac{1}{x-4} dx + \frac{7}{2} \int \frac{1}{x-2} dx$$

$$= \frac{5}{2} \ln|x-4| + \frac{7}{2} \ln|x-2| + C$$

$$B) \int \frac{4x^2 + 8x}{(x^2+1)(x^2+2x+3)} dx$$

$$= \int \frac{4x^2 + 8x}{(x^3)(x^2+2x+3)} dx$$

$$\frac{4x^2 + 8x}{(x^3)(x+1)(x+2)} = \frac{A}{x^3} + \frac{B}{x+1} + \frac{C}{x+2}$$

$$4x^2 + 8x = A(x+1)(x+2) + B(x^3)(x+2) + C(x^3)(x+1)$$

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