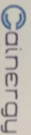


9/04/2020

SNV 38

MAT 102



Zacharias Patel | Ayodavi

1. $(11-3x) / (x^2 + 2x - 3)$

$\int \frac{11-3x}{x^2+2x-3} dx$

$x^2 + 2x - 3$

$(x-1)(x+3)$

$= \frac{A}{x-1} + \frac{B}{x+3} \rightarrow A(x+3) + B(x-1)$

$x-1 \quad x+3 \quad (x-1)(x+3)$

$A(x+3) + B(x-1) = 11-3x$

At $x = -3$, we have

$B(-4) = 11-3(-3)$

$B(-4) = 20$

$B = -5$

At $x = 1$

$A(1+3) = 11-3(1)$

$A(4) = 8$

$A = 2$

We can now write

$$\int \frac{2}{x+3} dx + \int \frac{-20}{x-1} = \int \frac{11-3x}{x^2+2x-3}$$

$$\begin{array}{ll} \rightarrow \text{let } u = x+3 & u = x-1 \\ du = dx & du = dx \\ = 2 \ln u & -5 \ln u \end{array}$$

$$2 \ln(x-1) - 5 \ln(x+3)$$

$$2) \int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} dx$$

$$4 \ln(x+1) - 3 \ln(x-2) + \ln(x+3)$$

$$\int \frac{1}{x^2 + 121}$$

$$\int \frac{dx}{x^2 + 11^2}$$

$$x = 11 \cos \theta$$

$$\frac{dx}{d\theta} = -11 \sin \theta$$

$$dx = -11 \sin \theta d\theta$$

$$-dx = 11 \sin \theta d\theta$$

$$\sqrt{11^2 \cos^2 \theta - 11^2}$$

$$= 11^2 \sin^2 \theta$$

$$= 11 \sin \theta$$

$$= \int \frac{11 \sin \theta d\theta}{11 \sin \theta}$$

$$= \int d\theta = \theta + C = \cos^{-1} \frac{x}{11}$$