$\therefore \frac{1}{11} \arctan\left(x/_{11}\right) + c$

$1/_{11} \arctan\left(x/_{11}\right) + c$

Combine $1/_{11}$ \$ $\arctan\left(x/_{11}\right)$

$= \frac{\arctan(x/11)}{11} + c$

$= 1/_{11} \arctan 1/_{11} x + c$

$1/_{11} \arctan\left(1/_{11} x\right) + c$

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$\therefore$ $1/u^2$ with respect to u_2 is $\ln(|u_2|) + c$

$= 2(\ln(|u_1|) + c) - 5(\ln(|u_2|) + c)$

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

2.) $\int \frac{2x^2-9x-35}{(x+1)(x-2)(x+3)} = \frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$

$\frac{2x^2-9x-35}{(x+1)(x-2)(x+3)} = \frac{A(x-2)(x+3)+B(x+1)(x+3)+C(x+1)(x-2)}{(x+1)(x-2)(x+3)}$

$2x^2-9x-35 = A(x-2)(x+3)+B(x+1)(x+3)+C(x+1)(x-2)$

$x = -1$

$2+9-35 = A(-3)(2)$

$-24 = 6A \quad \therefore A = 4$

when $x = 2$

$8-18-35 = B(3)(5)$

$\frac{-45}{15} = \frac{15}{15} \quad \therefore B = -3$

when $x = 3$

$18-24-35 = C(4)(2)$

$-44 = 8C \quad \therefore C = -11/2$

$\int \frac{4\,dx}{x+1}\,dx - \int \frac{3\,dx}{x-2} = \frac{1}{2}\int \frac{11}{x+3}\,dx = \int \frac{2x^2-9x-35}{(x+1)(x-2)(x+3)}\,dx$

$4\ln(x+1) - 3\ln(x-2) - 11/2(x+3)$.

3.) $\int \frac{dx}{(x^2+12)}$

$= \int \frac{1}{11^2+x^2}\,dx$

Respect to x is =

MAT 104 09/04/2020

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DEPT: Elect / Elect Engr.

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

Soln

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

* Using partial fraction decomposition

$$\int \frac{A_1}{(x+3)} + \frac{A_2}{(x-1)}\,dx = 11-3x \quad \text{let } x = -3$$

let $x = -3$

$A(-4) = 11+9$

$-4A = 20 \quad \therefore A = -5$

let $x = 1$ $\quad \therefore A-(4) = 11-3$

$4B = 8, \quad \therefore A = 2$

$$\int \frac{2}{x-1}\,dx + \int \frac{-5}{x+3}\,dx$$

$$2\int \frac{1}{x-1}\,dx - 5\int \frac{1}{x+3}$$

$u = x-1$ $\qquad u_2 = x+3$

$\frac{d}{dx}(x) + \frac{d}{dx}[-1]$ $\quad \frac{d}{dx}(x) + \frac{d}{dx}[3]$

$= 1$ $\qquad = 1$

$\therefore du = dx$ $\qquad du_2 = dx$

$$= 2\int \frac{1}{u_1}\,du_1 - 5\int \frac{1}{u^2}\,du_2$$

$\therefore$ Integrate $\frac{1}{u_1}$ with respect to u_1 is $\ln(|u_1|) + c$