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 Matric No: 19/MUSOU/104
 Course Code: MATH 104

Assignment

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

Solution

$x^2+2x-3=0 \implies (x-1)(x+3)$
 $(x-x)(1+x) \implies 0 = x-x-3=0$

$\int \frac{11-3x}{(x-1)(x+3)}$

$\frac{11-3x}{(x-1)(x+3)} = \frac{A}{x-1} + \frac{B}{x+3}$

Multiply through by $(x-1)(x+3)$

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

Let $x = -1+3 = 2 \implies (2-1)A = 2-3 \implies A = -1$

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

$20 = 0 + 1 + 4B \implies (2-1)A = 2 - (-3) \implies A = 5$

$B = -5$

Let $x = 1$

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

$8 = 4A + 1(-2) \implies (1-1)A = 8 - (-2) \implies A = 2$

$A = 2$

$\frac{11-3x}{(x-1)(x+3)} = \frac{2}{x-1} - \frac{5}{x+3}$

$$\int \left[\frac{2}{x-1} - \frac{5}{x+3} \right] dx$$

$$2 \ln|x-1| - 5 \ln|x+3| + C$$

2) $\int \frac{4x-16}{x^2-2x-3} dx$

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

$$x^2 - 2x - 3 = 0 \Rightarrow (x+1)(x-3)$$

$$\int \frac{4x-16}{(x+1)(x-3)}$$

$$= \frac{4x-16}{(x+1)(x-3)} = \frac{A}{x+1} + \frac{B}{x-3}$$

Multiply through by $(x+1)(x-3)$

$$4x-16 = A(x-3) + B(x+1)$$

let $x=3 \Rightarrow 4(3)-16 = A(3-3) + B(3+1) \Rightarrow -4 = 4B$

$$B = -1$$

$$A = 5$$

$$\int \frac{4x-16}{(x+1)(x-3)} = \int \frac{5}{x+1} - \frac{1}{x-3} dx = 5 \ln|x+1| - \ln|x-3| + C$$

$$\int \frac{4x-16}{(x+1)(x-3)} = \int \frac{5}{x+1} - \frac{1}{x-3} dx = 5 \ln|x+1| - \ln|x-3| + C$$

$$\int \left[\frac{5}{x+1} - \frac{1}{x-3} \right] dx$$

$$5 \ln|x+1| - \ln|x-3| + C$$

3.

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

Solution

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

Multiply through by $(x+1)(x-2)(x+3)$

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

$$\text{Let } x = -3$$

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

$$18 + 27 - 35 = 0 + 0 + 10C$$

$$10 = 10C$$

$$C = 1$$

$$\text{Let } x = 2$$

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

$$8 - 18 - 35 = 0 + 15B + 0$$

$$-45 = 15B$$

$$B = -3$$

$$\text{Let } x = -1$$

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

$$2 + 9 - 35 = -6A + 0 + 0$$

$$-24 = -6A$$

$$A = 4$$

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

$$\int \left[\frac{4}{x+1} - \frac{3}{x-2} + \frac{1}{x+3} \right] dx = 4 \ln|x+1| - 3 \ln|x-2| + \ln|x+3| + C$$

\Rightarrow $4 \ln|x+1| - 3 \ln|x-2| + \ln|x+3| + C$

antwort

$$2 + \frac{A}{s+x} + \frac{B}{s-x} + \frac{C}{s-1} = \frac{2s - xp - s^2}{(s+x)(s-x)(s-1)}$$

$(s-x)(s-x)$ ist der Nenner

$$(s-x)(s-x) + (s+x)(s-x) + (s+x)(s-x)A = 2s - xp - s^2$$

$$(s-x)(s-x) + (s+x)(s-x) + (s+x)(s-x)A = 2s - xp - s^2$$

$$2s + 0 + 0 = 2s - xp + 81$$

$$2 \cdot 0 = 0$$

$$r=0$$

$$s=0$$

$$(s-0)(s-0) + (s+x)(s-x) + (s+x)(s-x)A = 2s - xp - s^2$$

$$0 + 81 + 0 = 2s - xp - 81$$

$$81 = 2s - xp - 81$$