

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

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

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

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

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

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

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

$$11-3 = A(0) + 4B$$

$$8 = 4B$$

$$B = 8/4$$

$$\therefore B = 2$$

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

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

$$11+9 = -4A + B(0)$$

$$20 = -4A$$

$$20/-4 = A$$

$$\therefore A = -5$$

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

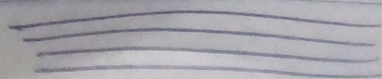
$$\int \left(\frac{2}{x-1} - \frac{5}{x+3} \right) dx$$

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

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

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

$$\therefore \int \frac{11-3x}{x^2+2x-3} = 2 \ln(x-1) - 5 \ln(x+3) + C$$



$$x^2 - 2x - 3 = 0$$

$$x^2 + 3x - x - 3 = 0$$

$$x(x+3) - 1(x+3) = 0$$

$$(x+3)(x-1) = 0$$

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

$$\int \frac{4x-16}{x^2-2x-3} dx = \int \frac{4x-16}{(x+3)(x-1)}$$

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

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

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

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

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

$$4-16 = A(0) + B(4)$$

$$-12 = 4B$$

$$-12/4 = B$$

$$\therefore B = -3$$

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

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

$$-12-16 = A(-4) + B(0)$$

$$-28 = -4A$$

$$-28/-4 = A$$

$$\therefore A = 7$$

$$\frac{4x-16}{(x+3)(x-1)} = \frac{7}{x+3} - \frac{3}{x-1}$$

$$\int \left(\frac{7}{x+3} - \frac{3}{x-1} \right) dx$$

$$\int \frac{7}{x+3} dx - \int \frac{3}{x-1} dx$$

$$= 7 \int \frac{1}{x+3} dx - 3 \int \frac{1}{x-1} dx$$

$$= 7 \ln(x+3) - 3 \ln(x-1) + C$$

$$\therefore \int \frac{4x-16}{x^2-2x-3} dx = 7 \ln(x+3) - 3 \ln(x-1) + C$$

Assignment -10

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

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

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

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

To get B, let $x = 2$

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

$$8 - 18 - 35 = A(0)(5) + B(3)(5) + C(3)(0)$$

$$-45 = 0 + 15B + 0$$

$$-45 = 15B$$

$$\frac{-45}{15} = B$$

$$\therefore B = -3$$

To get C, let $x = -3$

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

$$18 + 27 - 35 = A(-5)(0) + B(-2)(0) + C(-2)(-5)$$

$$10 = 0 + 0 + 10C$$

$$10 = 10C$$

$$\frac{10}{10} = C$$

$$\therefore C = 1$$

Let $x = 1$

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

$$2 - 9 - 35 = [A(-1)(4)] + [B(2)(4)] + [C(2)(-1)]$$

$$-42 = -4A + 8B + (-2C)$$

$$-42 = -4A + 8B - 2C$$

where $B = -3$ and $C = 1$

$$-42 = -4A + 8(-3) - 2(1)$$

$$-42 = -4A - 24 - 2$$

$$-42 = -4A - 26$$

$$-42 + 26 = -4A$$

$$-16 = -4A$$

$$\frac{-16}{-4} = A$$

$$A = 4$$

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

$$\int \left(\frac{4}{x+1} - \frac{3}{x-2} + \frac{1}{x+3} \right) dx$$

$$\int \frac{4}{x+1} dx - \int \frac{3}{x-2} dx + \int \frac{1}{x+3} dx$$

$$= 4 \int \frac{1}{x+1} dx - 3 \int \frac{1}{x-2} dx + \int \frac{1}{x+3} dx$$

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

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

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