

Integration by Partial Fractions.

Case I:- Non Repeated linear Factors.

Q1:- Evaluate $\int \frac{-x+6}{2x^2-7x+6} dx$ denominator $2x^2-7x+6$

$$2x^2 - 4x - 3x + 6$$

$$2x(x-2) - 3(x-2)$$

$$2(x-2)(2x-3)$$

$$A(x-\frac{3}{2})$$

$$\text{Let } \frac{-x+6}{(x-2)(2x-3)} = \frac{A}{x-2} + \frac{B}{2x-3}$$

x by $(x-2)(2x-3)$ on both sides.

$$-x+6 = A(2x-3) + B(x-2)$$

putting $x=2$

$$-2+6 = A(4-3) + B(2-2) \Rightarrow A=4$$

and now putting $x = \frac{3}{2}$

$$\frac{-3}{2} + 6 = A(\frac{3}{2}-3) + B(\frac{3}{2}-2)$$

$$\frac{-3+12}{2} = A(0) + B(\frac{3-4}{2})$$

$$\frac{9}{2} = B(\frac{-1}{2}) \Rightarrow B = -9$$

$$\text{Thus } \int \frac{-x+6}{(x-2)(2x-3)} dx = \int \left(\frac{4}{x-2} + \frac{-9}{2x-3} \right) dx$$

$$= 4 \int \frac{1}{x-2} dx - \frac{9}{2} \int \frac{2}{2x-3} dx$$

$$= 4 \ln(x-2) - \frac{9}{2} \ln(2x-3) + C$$