

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

$$\left[ \frac{-x+3}{x(x^2-2x+3)} = \frac{A_1}{x} + \frac{C_1x+D_1}{(x^2-2x+3)} \right] \times (x^2-2x+3)$$

$$-x+3 = A_1(x^2-2x+3) + C_1x^2 + D_1x$$

$$A_1 + C_1 = 0$$

$$-2A_1 + D_1 = -1$$

$$3A_1 = 3$$

$$\therefore D_1 = -1 + 2A_1$$

$$\boxed{D_1 = 1}$$

$$\boxed{A_1 = 1}$$

$$\therefore C_1 = -A_1$$

$$\boxed{C_1 = -1}$$

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

$$\left[ \begin{array}{l} u = x^2 - 2x + 3 \\ \frac{du}{dx} = (2x - 2) \frac{dx}{dx} \\ \frac{du}{2} = (x - 1) dx \end{array} \right] \therefore \frac{1}{2} \int \frac{du}{u} = -\frac{1}{2} \ln u + C_2$$

$$= -\frac{1}{2} \ln|x^2-2x+3|$$

$$= \frac{du}{2} = (-x+1) dx$$