

(1) لنحدد  $a$  و  $b$  حيث

$$\forall x \in \mathbb{R} - \{1, 2\} ; \frac{2}{x^2 - 3x + 2} = \frac{a}{x - 1} + \frac{b}{x - 2}$$

$$\begin{aligned} \frac{a}{x - 1} + \frac{b}{x - 2} &= \frac{a(x - 2) + b(x - 1)}{(x - 1) + (x - 2)} \quad \text{لدينا :} \\ &= \frac{(a + b)x - (2a + b)}{x^2 - 3x + 2} \end{aligned}$$

$$\begin{aligned} \frac{2}{x^2 - 3x + 2} = \frac{a}{x - 1} + \frac{b}{x - 2} &\Leftrightarrow \begin{cases} a + b = 0 \\ 2a + b = -2 \end{cases} \\ &\Leftrightarrow \begin{cases} b = -a \\ a = -2 \end{cases} \\ &\Leftrightarrow a = -2 \text{ و } b = 2 \end{aligned}$$

إذن :

$$\boxed{\forall x \in \mathbb{R} - \{1, 2\} ; \frac{2}{x^2 - 3x + 2} = \frac{-2}{x - 1} + \frac{2}{x - 2}}$$

$$\int_0^{\frac{1}{2}} \frac{2 dx}{x^2 - 3x + 2} = \int_0^{\frac{1}{2}} \left( \frac{-2}{x - 1} + \frac{2}{x - 2} \right) dx \quad (2)$$

$$= [-2 \ln |x - 1| + 2 \ln |x - 2|]_0^{\frac{1}{2}}$$

$$= \left[ 2 \ln \left( \frac{2 - x}{1 - x} \right) \right]_0^{\frac{1}{2}}$$

$$\boxed{\int_0^{\frac{1}{2}} \left( \frac{2}{x^2 - 3x + 2} \right) dx = 2 \ln \left( \frac{3}{2} \right)} \quad \text{إذن :}$$

إعداد الأستاذ : محمد أنفلوس