

$$\begin{aligned}
 J_1 &= \int_0^2 |x - 1| dx & * \\
 &= \int_0^1 (1 - x) dx + \int_1^2 (x - 1) dx \\
 &= \left[x - \frac{x^2}{2} \right]_0^1 + \left[\frac{x^2}{2} - x \right]_1^2 \\
 &= 1
 \end{aligned}$$

$$\begin{aligned}
 J_2 &= \int_0^{\pi} |\cos x| dx & * \\
 &= \int_0^{\frac{\pi}{2}} \cos x dx + \int_{\frac{\pi}{2}}^{\pi} -\cos x dx \\
 &= [\sin x]_0^{\frac{\pi}{2}} + [\sin x]_{\frac{\pi}{2}}^{\pi} \\
 &= 2
 \end{aligned}$$

$$x^2 - 3x + 2 = (x - 1)(x - 2) \quad \text{لدينا :} *$$

x	0	1	2	و
$x^2 - 3x + 2$	+	0	—	0

$$\begin{aligned}
 J_3 &= \int_0^2 |x^2 - 3x + 2| dx & \text{إذن :} \\
 &= \int_0^1 (x^2 - 3x + 2) dx + \int_1^2 -(x^2 - 3x + 2) dx \\
 &= \left[\frac{x^3}{3} - \frac{3}{2}x^2 + 2x \right]_0^1 - \left[\frac{x^3}{3} - \frac{3}{2}x^2 + 2x \right]_1^2 \\
 &= 1
 \end{aligned}$$

$$\begin{aligned}
 J_4 &= \int_{\frac{1}{e}}^e \frac{|\ln x|}{x} dx & * \\
 &= \int_{\frac{1}{e}}^1 \frac{-\ln x}{x} dx + \int_1^e \frac{\ln x}{x} dx \\
 &= \left[-\frac{1}{2} \ln^2 x \right]_{\frac{1}{e}}^1 + \left[\frac{1}{2} \ln^2 x \right]_1^e \\
 &= 1
 \end{aligned}$$

$$\begin{aligned}
 J_5 &= \int_{-1}^1 |e^x - 1| dx \\
 &= \int_{-1}^0 (1 - e^x) dx + \int_0^1 (e^x - 1) dx \\
 &= [x - e^x]_{-1}^0 + [e^x - x]_0^1 \\
 &= e + e^{-1} - 2
 \end{aligned}$$

$$\begin{aligned}
 1 - 2e^x \geq 0 &\Leftrightarrow e^x \leq \frac{1}{2} & \text{لدينا :} * \\
 &\Leftrightarrow x \leq -\ln 2
 \end{aligned}$$

$$\forall x \in [-\ln 2, \ln 2] ; 1 - 2e^x \leq 0 \quad \text{إذن :}$$

$$\begin{aligned}
 J_6 &= \int_{-\ln 2}^{\ln 2} |1 - 2e^x| dx & \text{ومنه فإن :} \\
 &= \int_{-\ln 2}^{\ln 2} (2e^x - 1) dx
 \end{aligned}$$

$$\begin{aligned} &= [2e^x - x]_{-\ln 2}^{\ln 2} \\ &= 3 - 2 \ln 2 \end{aligned}$$

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