سلم تصحيح مادة تفاضل وتكامل

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الجواب النموذجي:

[1] $y = \sin(x^3+1)$

نفرض: $y = \sin u$ و $u = x^3+1$ ③

$y'_x = y'_u \cdot u'_x = (\sin u)'_x \cdot (x^3+1)'_x$ ③ ③

$= \cos u \cdot 3x^2 = 3x^2 \cos(x^3+1)$ ③ ③

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[2] $y = \operatorname{tg} x$

$y = \frac{\sin x}{\cos x}$ ②

$y' = \frac{(\sin x)'\cos x - (\cos x)' \cdot \sin x}{\cos^2 x}$ ②

$= \frac{\cos^2 x + \sin^2 x}{\cos^2 x}$ ②

$= \frac{1}{\cos^2 x}$ ② $= 1 + \operatorname{tg}^2 x$ ②

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[3] $y = 3^{\operatorname{tg} x}$

نكون $y = 3^u$ ③ حيث $u = \operatorname{tg} x$ ③

$\Rightarrow y'_x = (3^u)'_u \cdot (\operatorname{tg} x)'_x$ ③

$= 3^u \cdot \ln 3 \cdot \frac{1}{\cos^2 x}$ ③

$= 3^{\operatorname{tg} x} \cdot \ln 3 \cdot \frac{1}{\cos^2 x}$ ③

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3 $\int (x^2 - 2x + 7) e^{2x} \, dx$

$u = x^2 - 2x + 7$ (5) $dv = e^{2x} \, dx$

$du = 2x - 2 \, dx$ $\quad v = \frac{1}{2} e^{2x}$

$$\int (x^2 - 2x + 7) e^{2x} \, dx = \frac{1}{2} (x^2 - 2x + 7) e^{2x} - \int \frac{1}{2} e^{2x} (2x - 2) \, dx$$

$$= \frac{1}{2} (x^2 - 2x + 7) - \int (x - 1) e^{2x} \, dx$$ (5)

أي

$u = (x - 1)$ و $dv = e^{2x} dx$

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

$$= \frac{1}{2} (x - 1) e^{2x} - \frac{1}{4} e^{2x} + c$$ (5)

نعوض:

$$\int (x^2 - 2x + 7) e^{2x} dx =$$ (5)

$$\frac{1}{2} (x^2 - 2x + 7) e^{2x} - \frac{1}{2} (x - 1) e^{2x} + \frac{1}{4} e^{2x} + c$$