Sujet Porte

Effectuez les calculs suivants

$I = \int_0^1 (4x - 3)\, dx$ $\quad J = \int_1^3 \left(t + 1 + \frac{1}{t}\right) dt$ $\quad K = \int_0^{\pi/3} \cos\left(2x - \frac{\pi}{6}\right) dx$

$L = \int_0^4 \frac{2x+1}{\sqrt{x^2+x+16}}\, dx$ $\quad M = \int_1^{e^3} \frac{5}{x} (\ln x + 1)^4\, dx$ $\quad N = \int_{-1}^0 \frac{5x-15}{(x^2-6x+2)^2}\, dx$

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Correction

$$I=\int_0^1 (4x-3)\,dx=[2x^2-3x]_0^1=2-3-(0-0)=-1$$

$$J=\int_1^3 \left(t+1+\frac{1}{t}\right)dt=[2t^2+t+\ln t]_1^3=18+3+\ln(3)-(2+1+0)$$

$$=18+\ln(3)$$

$$K=\int_0^{\frac{\pi}{3}}\cos\left(2x-\frac{\pi}{6}\right)dx=\left[\frac{1}{2}\sin\left(2x-\frac{\pi}{6}\right)\right]_0^{\frac{\pi}{3}}=\frac{1}{2}\sin\left(\frac{2\pi}{3}-\frac{\pi}{6}\right)-\frac{1}{2}\sin\left(-\frac{\pi}{6}\right)$$

$$=\frac{1}{2}\sin\left(\frac{\pi}{2}\right)-\frac{1}{2}\sin\left(-\frac{\pi}{6}\right)=\frac{1}{2}-\frac{1}{2}\left(-\frac{1}{2}\right)=\frac{3}{4}$$

$$L=\int_0^4 \frac{2x+3}{\sqrt{x^2+x+16}}\,dx=\left[2\sqrt{x^2+x+16}\right]_0^4=2\sqrt{36}-2\sqrt{16}=12-8=4$$

$$M=\int_1^{e^3}\frac{5}{x}(\ln x+1)^4\,dx=\left[\frac{5(\ln x+1)^5}{5}\right]_1^{e^3}=(\ln e^3+1)^5-(\ln 1+1)^5$$

$$=(3+1)^5-1^5=1024-1=1023$$

$$N=\int_{-1}^0 \frac{5x-15}{(x^2-6x+2)^2}\,dx=\int_{-1}^0 \frac{5}{2}\frac{2x-6}{(x^2-6x+2)^2}\,dx=\left[\frac{5}{2}\frac{-1}{(x^2-6x+2)}\right]_{-1}^0$$

$$=-\frac{5}{2(2)}+\frac{5}{2(1+6+2)}=\frac{-5}{4}+\frac{5}{18}=\frac{-35}{36}$$

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$$=5\frac{-1}{3(\ln e^3+1)^3}-5\frac{-1}{3(\ln 1+1)^3}=5\frac{-1}{3\times 4^3}-5\frac{-1}{3\times 1}=-\frac{5}{192}+\frac{5}{3}=\frac{105}{64}$$

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$$=5\sqrt{2}-5\sqrt{9}=5\sqrt{2}-15$$

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