S 101 Nr. 3

f.) $\int_0^{\pi} \sin(3x-\pi)\,dx = \left[-\cos(3x-\pi)\cdot\frac{1}{3}\right]_0^{\pi} = \left[-\frac{1}{3}\cdot\cos(3x-\pi)\right]_0^{\pi}$

$= -\frac{1}{3}\cdot\cos(3\pi-\pi) - \left\{-\frac{1}{3}\cdot\cos(3\cdot 0-\pi)\right\}$

$= -\frac{1}{3}\cdot 1 + \frac{1}{3}(-1) = -\frac{1}{3} - \frac{1}{3} = \underline{\underline{-\frac{2}{3}}}$

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g.) $\int_{-1}^{1} \frac{1}{5} e^{\frac{1}{2}x}\,dx = \left[\frac{1}{5}\cdot e^{\frac{1}{2}x}\cdot\frac{1}{\frac{1}{2}}\right]_{-1}^{1} = \left[\frac{2}{5}\cdot e^{\frac{1}{2}x}\right]_{-1}^{1} =$

$= \frac{2}{5}\cdot e^{\frac{1}{2}} - \left\{\frac{2}{5}\cdot e^{-\frac{1}{2}}\right\} = \underline{\underline{\frac{2}{5}\cdot\left(e^{\frac{1}{2}} - e^{-\frac{1}{2}}\right)}} \approx \underline{\underline{0{,}417}}$

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h.) $\int_{-\pi}^{\pi} \cos(3x)\,dx = \left[\sin(3x)\cdot\frac{1}{3}\right]_{-\pi}^{\pi} = \left[\frac{1}{3}\cdot\sin(3x)\right]_{-\pi}^{\pi} =$

$= \frac{1}{3}\underbrace{\sin(3\cdot\pi)}_{=0} - \left\{\frac{1}{3}\cdot\underbrace{\sin(3\cdot(-\pi))}_{=0}\right\} = \frac{1}{3}\cdot 0 - \frac{1}{3}\cdot 0 = \underline{\underline{0}}$

S 101 Nr. 4

a) $\int_1^5 \frac{3}{x}\,dx = 3\cdot\int_1^5 \frac{1}{x}\,dx = \left[3\cdot\ln(|x|)\right]_1^5 = 3\cdot\ln(5) - 3\cdot\underbrace{\ln(1)}_{=0} = \underline{\underline{3\cdot\ln(5)}}$

$\approx \underline{\underline{4{,}828}}$

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b) $\int_1^2 \left(1+\frac{1}{x}\right)dx = \left[1\cdot x + \ln(|x|)\right]_1^2 = 2 + \ln(2) - \left\{1 + \underbrace{\ln(1)}_{=0}\right\} = \underline{\underline{1+\ln(2)}}$

$\approx \underline{\underline{1{,}693}}$

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c) $\int_3^4 \frac{1}{2(x+1)}\,dx = \left[\frac{1}{2}\cdot\ln(|x+1|)\right]_3^4 = \frac{1}{2}\cdot\ln(4+1) - \left\{\frac{1}{2}\cdot\ln(3+1)\right\}$

$= \underline{\underline{\frac{1}{2}\left(\ln(5) - \ln(4)\right)}} \approx \underline{\underline{0{,}112}}$

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d) $\int_1^4 \frac{3}{(2x-1)}\,dx = \left[3\cdot\ln(|2x-1|)\cdot\frac{1}{2}\right]_1^4 = \left[\frac{3}{2}\cdot\ln(|2x-1|)\right]_1^4$

$= \frac{3}{2}\cdot\ln(7) - \frac{3}{2}\ln(1) = \underline{\underline{\frac{3}{2}\cdot\ln(7)}} \approx \underline{\underline{2{,}919}}$