Interrogation. 20 minutes.

$$\int_1^2 \frac{1}{t}\,\mathrm{d}t = [\ln(t)]_1^2 = \ln(2) - \ln(1) = \ln(2).$$

$$\int_0^1 t^3 - 5\,\mathrm{d}t = \left[\frac{1}{4}t^4 - 5t\right]_0^1 = \frac{1}{4}\times 1^4 - 5\times 1 - \left(\frac{1}{4}\times 0^4 - 5\times 0\right) = -\frac{19}{4}.$$

$$\int_1^4 \frac{2}{\sqrt{x}}\,\mathrm{d}x = \left[4\sqrt{2}\right]_1^4 = 4\sqrt{4} - 4\sqrt{1} = 4.$$

$$\int_{-\pi}^{\pi} \sin(x)\cos(x)\,\mathrm{d}x = \left[\frac{1}{2}\sin^2(x)\right]_{-\pi}]^{\pi} = \frac{1}{2}\sin^2(\pi) - \frac{1}{2}\sin^2(-\pi).$$

Argument de parité possible.

$$\int_1^2 t^2 \mathrm{e}^{t^3}\,\mathrm{d}t = \left[\frac{1}{3}\mathrm{e}^{t^3}\right]_1^2 = \frac{1}{3}\mathrm{e}^{2^3} - \frac{1}{3}\mathrm{e}^{1^3} = \frac{\mathrm{e}^8 - \mathrm{e}}{3}.$$

$\dfrac{1}{\ln(2)-0}\displaystyle\int_0^{\ln(2)} \mathrm{e}^{-x} \, \mathrm{d}x = \dfrac{1}{\ln(2)}\left[-\mathrm{e}^{-x}\right]_0^{\ln(2)} = \dfrac{1}{\ln(2)}\left(-\mathrm{e}^{-\ln(2)} - \left(-\mathrm{e}^{-0}\right)\right) = \dfrac{1}{2\ln(2)}$.

Posons $u'(t) = \mathrm{e}^t$ et $v(t) = 2t+1$ donc $u(t) = \mathrm{e}^t$ et $v'(t) = 2$. u' et v' étant continues on peut intégrer par parties : $\displaystyle\int_0^1 (2t+1)\mathrm{e}^t \, \mathrm{d}t = \int_0^1 u'(t)v(t)\,\mathrm{d}t = [u(t)v(t)]_0^1 - \int_0^1 u(t)v'(t)\,\mathrm{d}t = \left[\mathrm{e}^t \times (2t+1)\right]_0^1 - \int_0^1 \mathrm{e}^t \times 2 \, \mathrm{d}t = \mathrm{e}^1 \times (2\times 1+1) - \mathrm{e}^0 \times (2\times 0+1) - 2\left[\mathrm{e}^t\right]_0^1 = 3\mathrm{e} - 1 - 2\left(\mathrm{e}^1 - \mathrm{e}^0\right) = \mathrm{e}+1$.