

$$a/I = \int_0^1 x^2 dx = \left[\frac{x^3}{3} \right]_0^1 = \frac{1^3}{3} - \frac{0^3}{3} = \frac{1}{3}$$

$$b/I = \int_{-2}^4 (x^2 - x + 1) dx = \left[\frac{x^3}{3} - \frac{x^2}{2} + x \right]_{-2}^4 = \left(\frac{4^3}{3} - \frac{4^2}{2} + 4 \right) - \left(\frac{(-2)^3}{3} - \frac{(-2)^2}{2} + (-2) \right) = \left(\frac{64}{3} - 4 \right) - \left(-\frac{8}{3} - 4 \right) = \frac{72}{3} = \mathbf{24}$$

$$c/I = \int_0^6 2e^{-x} dx = [-2e^{-x}]_0^6 = (-2e^{-6}) - (-2e^0) = -2e^{-6} + 2 \approx \mathbf{1,995}$$

$$d/I = \int_{-1}^3 (12 - 4x) dx = [12x - 2x^2]_{-1}^3 = (12 \times 3 - 2 \times 3^2) - (12 \times (-1) - 2 \times (-1)^2) = 18 - (-14) = \mathbf{32}$$

$$e/I = \int_1^4 \left(\frac{2x+1}{x} \right) dx = \int_1^4 \left(\frac{2x}{x} + \frac{1}{x} \right) dx = \int_1^4 \left(2 + \frac{1}{x} \right) dx = [2x + \ln x]_1^4 = (2 \times 4 + \ln 4) - (2 \times 1 + \ln 1) = 8 + \ln 4 - 2 = \mathbf{6 + \ln 4 \approx 7,386}$$

$$f/I = \int_0^5 (e^x + 2x) dx = [e^x + x^2]_0^5 = (e^5 + 5^2) - (e^0 + 0^2) = e^5 + 25 - 1 = \mathbf{e^5 + 24 \approx 172,41}$$

$$g/I = \int_0^3 \frac{2x}{x^2+1} dx = \int_0^3 f(x) dx \quad \text{avec} \quad f(x) = \frac{2x}{x^2+1} \quad \text{or} \quad f \text{ est de la forme } \frac{u'}{u} \text{ avec } u(x) = x^2 + 1 \text{ donc } u'(x) = 2x \quad \text{ainsi} \quad f = \frac{u'}{u}$$

donc une primitive de f est $F = \ln(u)$ soit $F(x) = \ln(x^2 + 1)$

$$\text{on a alors } I = \int_0^3 f(x) dx = F(3) - F(0) = \ln(3^2 + 1) - \ln(0^2 + 1) = \ln 10 - \ln 1 = \mathbf{\ln 10 \approx 2,3}$$

$$h/I = \int_1^e \frac{\ln x}{x} dx = \int_1^e f(x) dx \quad \text{avec} \quad f(x) = \frac{\ln x}{x} = \frac{1}{x} \times \ln x \quad \text{ainsi } f \text{ est de la forme } u' \times u \text{ avec } u(x) = \ln x \text{ donc } u'(x) = \frac{1}{x} \quad \text{ainsi } f = u' \times u$$

donc une primitive de f est $F = \frac{1}{2}u^2$ soit $F(x) = \frac{1}{2}(\ln x)^2$

$$\text{on a alors } I = \int_1^e f(x) dx = F(e) - F(1) = \frac{1}{2} \times (\ln e)^2 - \frac{1}{2} \times (\ln 1)^2 = \frac{1}{2} \times 1^2 - \frac{1}{2} \times 0^2 = \frac{1}{2}$$