

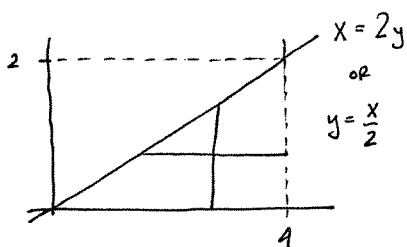
1. Integrate.

$$(a) \boxed{3} \int_1^2 \int_1^x \frac{dy dx}{y^2} = \int_1^2 -y^{-1} \Big|_1^x dx = \int_1^2 \left(1 - \frac{1}{x}\right) dx = x - \ln x \Big|_1^2 = 2 - \ln 2 - 1 + \ln 1 = 1 - \ln 2$$

✧ Definite Integrals are numbers! ✧

$$(b) \boxed{3} \int_0^2 \int_0^x \int_0^y 4xy^2 e^{yz} dz dy dx = \int_0^2 \int_0^x 4xy e^{yz} \Big|_0^y dy dx = \int_0^2 \int_0^x (4xy e^{y^2} - 4xy) dy dx = \int_0^2 (2x e^{y^2} - 2xy^2) \Big|_0^x dx = \int_0^2 (2x e^{x^2} - 2x^3 - 2x) dx = e^{x^2} - \frac{x^4}{2} - x^2 \Big|_0^2 = e^4 - 8 - 4 - 0 = e^4 - 13$$

2. 4 Sketch the domain of integration. Then change the order of integration and evaluate.



$$\int_0^2 \int_{2y}^4 \frac{\cos x}{x} dx dy = \int_0^4 \int_0^{x/2} \frac{\cos x}{x} dy dx = \int_0^4 \frac{1}{2} \cos x dx = \frac{1}{2} \sin x \Big|_0^4 = \frac{1}{2} \sin 4$$