Module 7 self-assessment

Question 1

Compute

$$\iint_R xy \mathrm{d}A$$

when R is the region under the curve $y = x^2$ from $(0, 0)$ to $(2, 4)$.

Question 2

Evaluate the integral

$$\int_0^1 \int_{3y}^3 \mathrm{e}^{2x} \mathrm{d}x\mathrm{d}y$$

after reversing the order of integration.

Hint: You may use the single variable integral

$$\int x\mathrm{e}^{ax} \mathrm{d}x = \frac{\mathrm{e}^{ax}}{2}(x - \frac{1}{a}).$$

Question 3

Compute the integral

$$\iint_R y \mathrm{d}y\mathrm{d}x,$$

where R is the region bounded from below by the straight line $y = 2x$ and above the parabola $y = 3 - x^2$.