

$$1. \int_0^4 (\int_0^{\sqrt{y}} xy^2 dx) dy$$

$$\begin{aligned} \blacksquare \int_0^{\sqrt{y}} xy^2 dx &= \\ \left. \frac{x^2 y^2}{2} \right|_0^{\sqrt{y}} &= \\ \frac{y^3}{2} & \\ \blacksquare \int_0^4 \frac{y^3}{2} dy &= \\ \left. \frac{y^4}{8} \right|_0^4 &= \\ 32 & \end{aligned}$$

$$2. \int_0^1 (\int_{x^2}^x (1+2y) dy) dx =$$

$$\begin{aligned} \blacksquare \int_{x^2}^x (1+2y) dy &= \\ y + y^2 \Big|_{x^2}^x &= \\ x + x^2 - x^2 - x^4 &= \\ x - x^4 & \\ \blacksquare \int_0^1 x - x^4 dx &= \\ \left. \frac{x^2}{2} - \frac{x^5}{5} \right|_0^1 &= \\ \frac{1}{2} - \frac{1}{5} &= \frac{3}{10} \end{aligned}$$