

Partial Solutions, Homework 1

Answer to 16.2.28:

$$\begin{aligned}\int_{-1}^1 \int_0^\pi 1 + e^x \sin(y) dy dx &= \int_{-1}^1 \pi + 2e^x dx \\ &= 2\pi + 2(e - e^{-1})\end{aligned}$$

Answer to 16.3.44:

$$\int_0^{\pi/4} \int_0^{\tan(y)} f(x, y) dx dy.$$

- Evaluate the following by reversing the order of integration

$$\int_0^1 \int_x^1 e^{x/y} dy dx.$$

(Cf. problem 16.3.48 in the 6th ed.)

Answer: $\{0 \leq x \leq 1, x \leq y \leq 1\} = \{0 \leq x \leq y, 0 \leq y \leq 1\}$,
hence the answer is

$$\begin{aligned}\int_0^1 \int_0^y e^{x/y} dx dy &= \int_0^1 \left[ye^{x/y} \right]_{x=0}^{x=y} dy \\ &= \int_0^1 y(e - 1) dy \\ &= \frac{1}{2}(e - 1)\end{aligned}$$