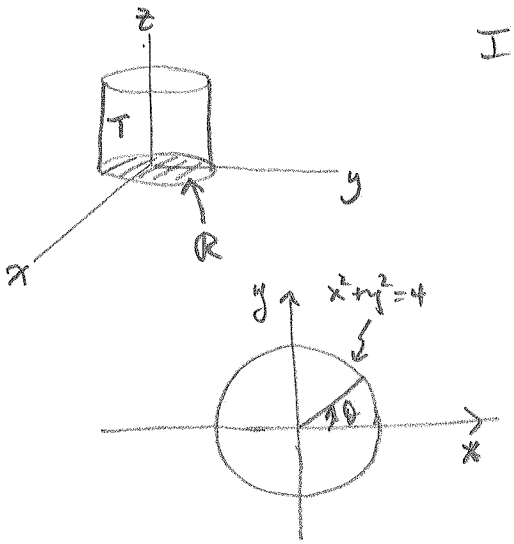
2 b) $J = \overbrace{\int_0^1 \int_0^z y^2 z \, dy \, dz}^{(2)} = \overbrace{\int_0^1 \frac{1}{3} z^4 \, dz}^{(2)} = \overbrace{\frac{1}{15}}^{(1)}$

7. **[5 marks]** Evaluate the iterated integral $\int\int\int_T e^{x^2+y^2} \, dV$ where T is the solid bounded by the cylinder $x^2 + y^2 = 4$ and the planes $z = 0$ and $z = 4$.

Use cylindrical coordinates. ← (1)



$$I = \iiint_T e^{x^2+y^2} \, dV$$

$$= \iint_R \int_{z=0}^{z=4} e^{x^2+y^2} \, dV$$

$$= \int_0^{2\pi} \int_0^2 \int_0^4 (r e^{r^2}) \, dz \, dr \, d\theta$$

(2) (1)

$$= \cdots$$

$$= 4\pi(e^4 - 1)$$

(1)

$R = \{(r,\theta) : 0 \le r \le 2, \ 0 \le \theta \le 2\pi\}$.