15.1

#26. $\int_0^1 \int_0^1 \sqrt{s+t}\, ds\, dt$

$u = s+t$

$du = ds$

$u(0) = 0+t$

$u(1) = 1+t$

$$= \int_0^1 \int_t^{1+t} u^{1/2}\, du\, dt$$

$$= \int_0^1 \frac{2}{3} u^{3/2} \Big|_t^{1+t} dt$$

$$= \frac{2}{3} \int_0^1 (1+t)^{3/2} - t^{3/2}\, dt$$

$$= \frac{2}{3} \left[\frac{2}{5}(1+t)^{5/2} - \frac{2}{5} t^{5/2} \right]_0^1$$

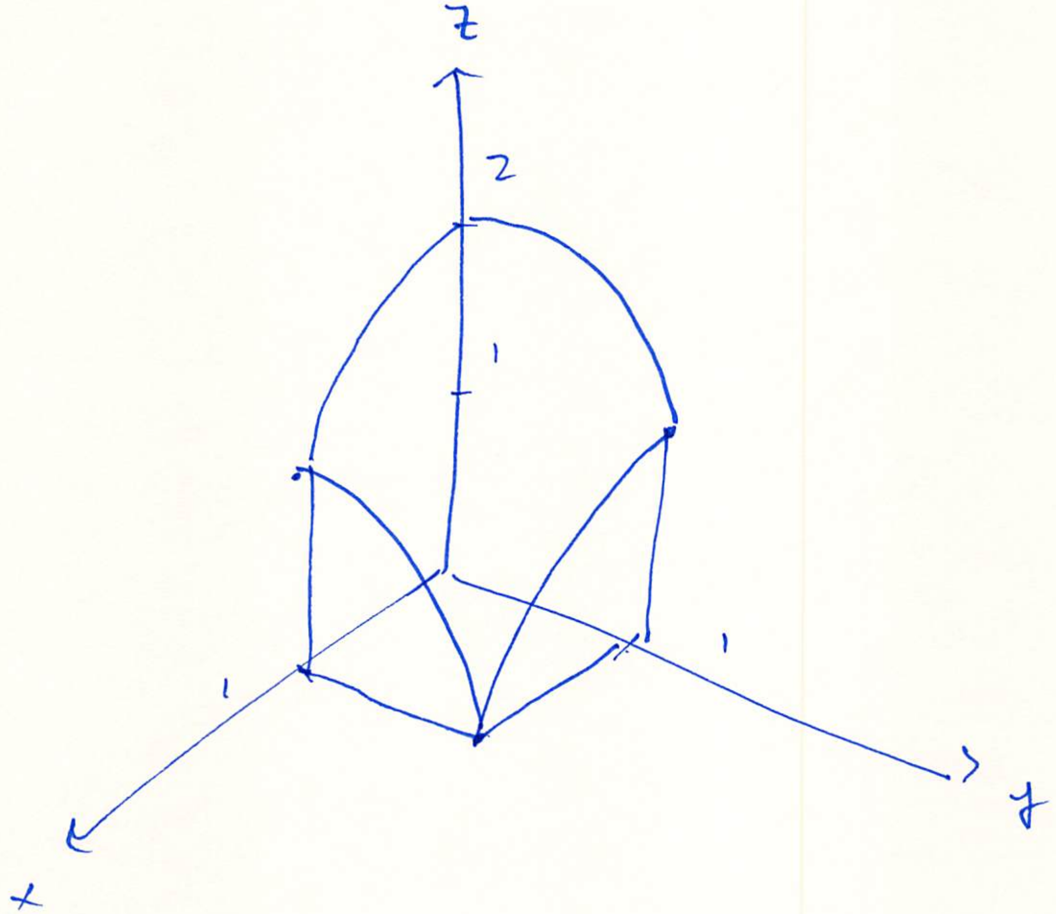
$$= \frac{4}{15} \cdot \left[2^{5/2} - 1 - (1-0) \right]$$

$$= \frac{4}{15} \left[2^{5/2} - 2 \right]$$

or

$$= \frac{8}{15} \left[2^{3/2} - 1 \right]$$

#36. $\int_0^1 \int_0^1 2 - x^2 - y^2 \; dy\,dx$



#50.

$$\iint_R \left(1 + x^2 \sin y + y^2 \sin x\right) dA, \quad R = [-\pi, \pi]^2$$

$$= \iint_R 1\, dA + \iint_R \underbrace{x^2 \sin y}_{\substack{\text{odd function} \\ \text{of } y}}\, dA + \iint_R \underbrace{y^2 \sin x}_{\substack{\text{odd function} \\ \text{of } x.}}\, dA$$

$$\qquad\qquad\qquad = 0 \qquad\qquad\qquad\qquad = 0$$

$$= \iint_R 1\, dA$$

= volume of box of dimensions

$2\pi \times 2\pi \times 1$

$$= 4\pi^2$$