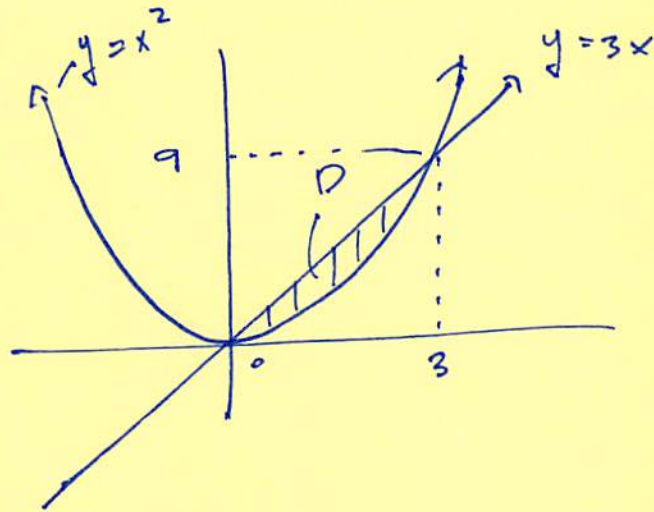


11



$$\begin{aligned}x^2 &= 3x \\ \Rightarrow x^2 - 3x &= 0 \\ \Rightarrow (x-3)x &= 0 \\ x &= 3, 0.\end{aligned}$$

Type I:

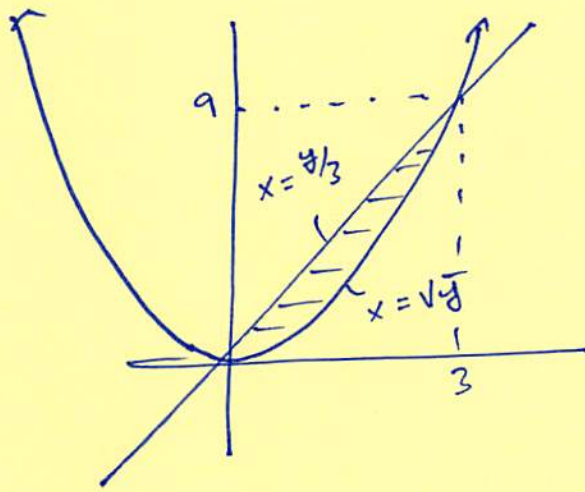
$$\iint_D xy \, dA = \int_0^3 \int_{x^2}^{3x} xy \, dy \, dx$$

$$= \int_0^3 x \left. \frac{y^2}{2} \right|_{x^2}^{3x} dx$$

$$= \frac{1}{2} \int_0^3 x \left[(3x)^2 - (x^2)^2 \right] dx$$

$$= \frac{1}{2} \int_0^3 9x^3 - x^5 dx$$

$$= \frac{1}{2} \left[\frac{9}{4} x^4 - \frac{1}{6} x^6 \right]_0^3 = \frac{243}{8}$$



Type II :

$$\iint_D xy \, dA = \int_0^9 \int_{y/3}^{\sqrt{y}} xy \, dx \, dy$$

$$= \int_0^9 y \left. \frac{x^2}{2} \right|_{y/3}^{\sqrt{y}} dy$$

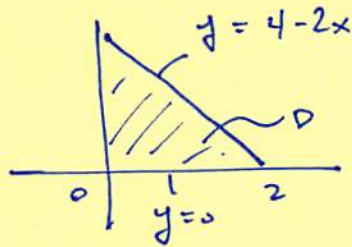
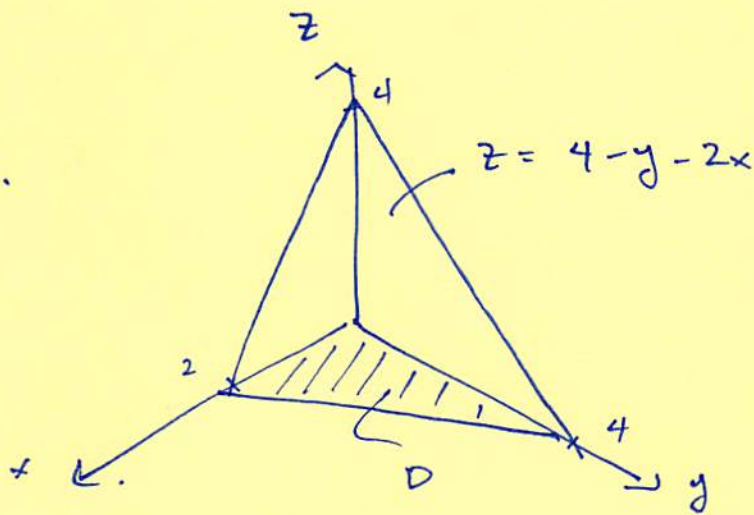
$$= \frac{1}{2} \int_0^9 y \left((\sqrt{y})^2 - (y/3)^2 \right) dy$$

$$= \frac{1}{2} \int_0^9 y^2 - \frac{y^3}{9} dy$$

$$= \frac{1}{2} \left[\frac{y^3}{3} - \frac{1}{36} y^4 \right]_0^9$$

$$= \frac{243}{8}$$

#27.



$$V = \iint_D (4 - y - 2x) \, dA = \int_0^2 \int_0^{4-2x} (4 - y - 2x) \, dy \, dx$$

$$= \int_0^2 \left((4-2x)y - \frac{y^2}{2} \right) \Big|_0^{4-2x} \, dx$$

$$u = 4 - 2x$$

$$du = -2 \, dx$$

$$u(0) = 4$$

$$u(2) = 0$$

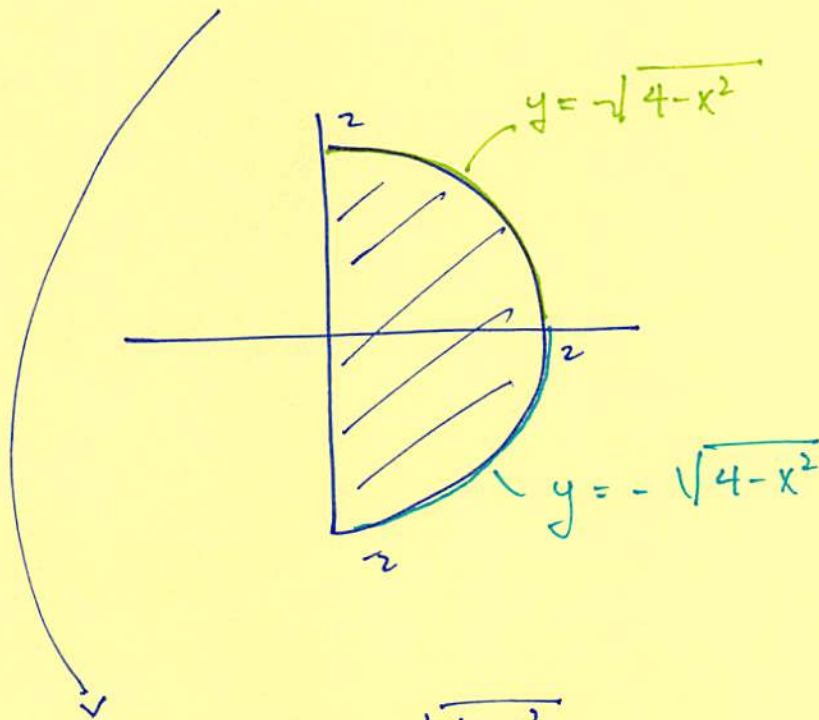
$$= \frac{1}{2} \int_0^2 (4-2x)^2 \, dx$$

$$= \frac{1}{4} \int_0^4 u^2 \, du$$

$$= \frac{1}{4} \cdot \frac{1}{3} [4^3 - 0^3] = \frac{16}{3}$$

48

$$\int_{-2}^2 \int_0^{\sqrt{4-y^2}} f(x,y) dx dy$$



$$= \int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} f(x,y) dy dx$$