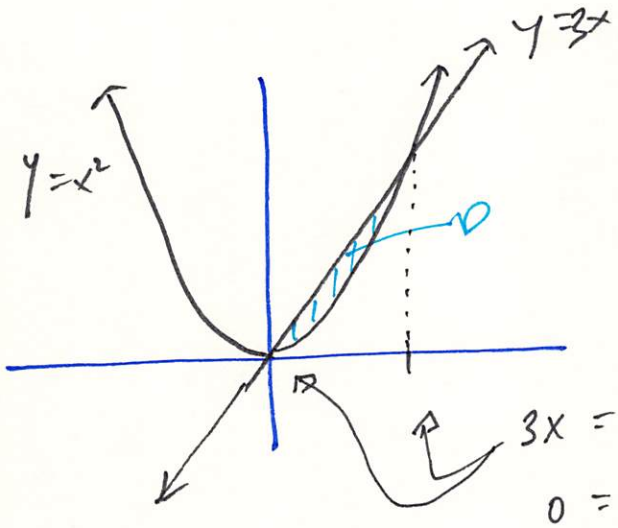
#14 15.2.14



$0 = x^2 - 3x = x(x-3)$

$x = 0$ or 3.

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

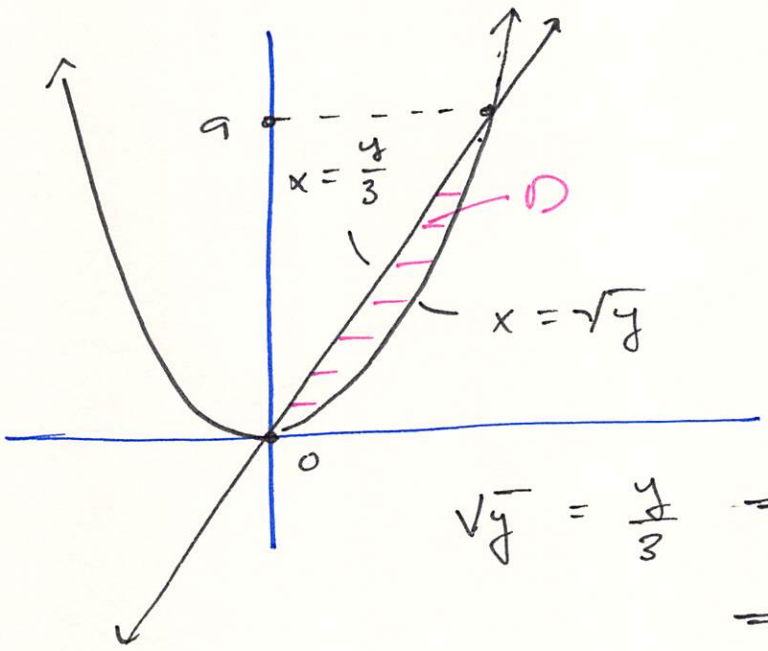
$$= \int_0^3 x\frac{y^2}{2}\Big]_{x^2}^{3x} dx$$

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

$$= \frac{9}{2}\cdot\frac{x^4}{4} - \frac{1}{2}\frac{x^6}{6}\Big|_0^3$$

$$= \frac{1}{2}\frac{243}{4}$$

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



$\sqrt{y} = \frac{y}{3} \Rightarrow 9y = y^2$

$\Rightarrow y(y-9) = 0$

$y = 0$ or 9.

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

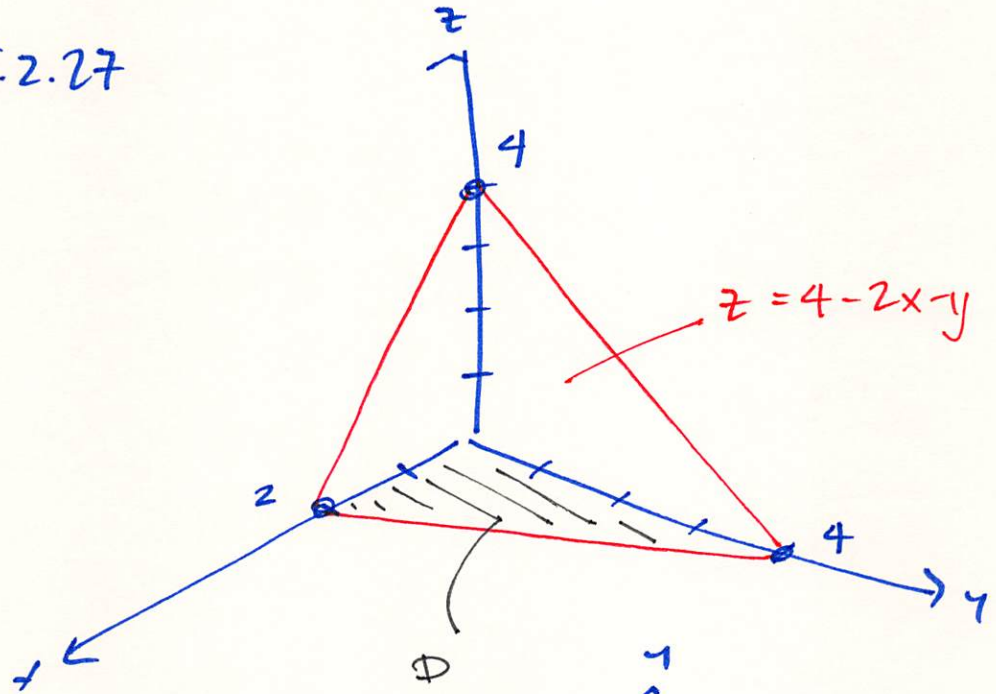
$$= \int_0^9 y\,\frac{x^2}{2}\Big|_{y/3}^{\sqrt{y}}\,dy$$

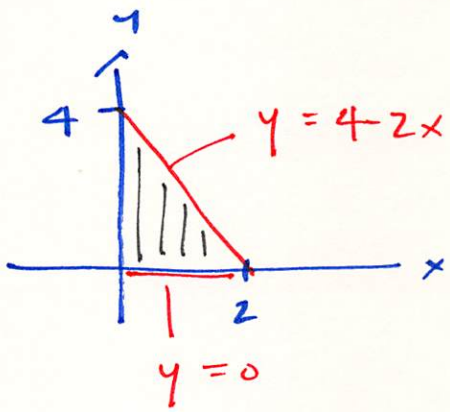
$$= \int_0^9 \frac{y^2}{2} - \frac{y^3}{18}\,dy$$

$$= \frac{1}{2}\cdot\frac{y^3}{3} - \frac{1}{18}\cdot\frac{y^4}{4}\Big|_0^9$$

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

#15.2.27





$$V = \iint_D 4 - 2x - y \, dA$$

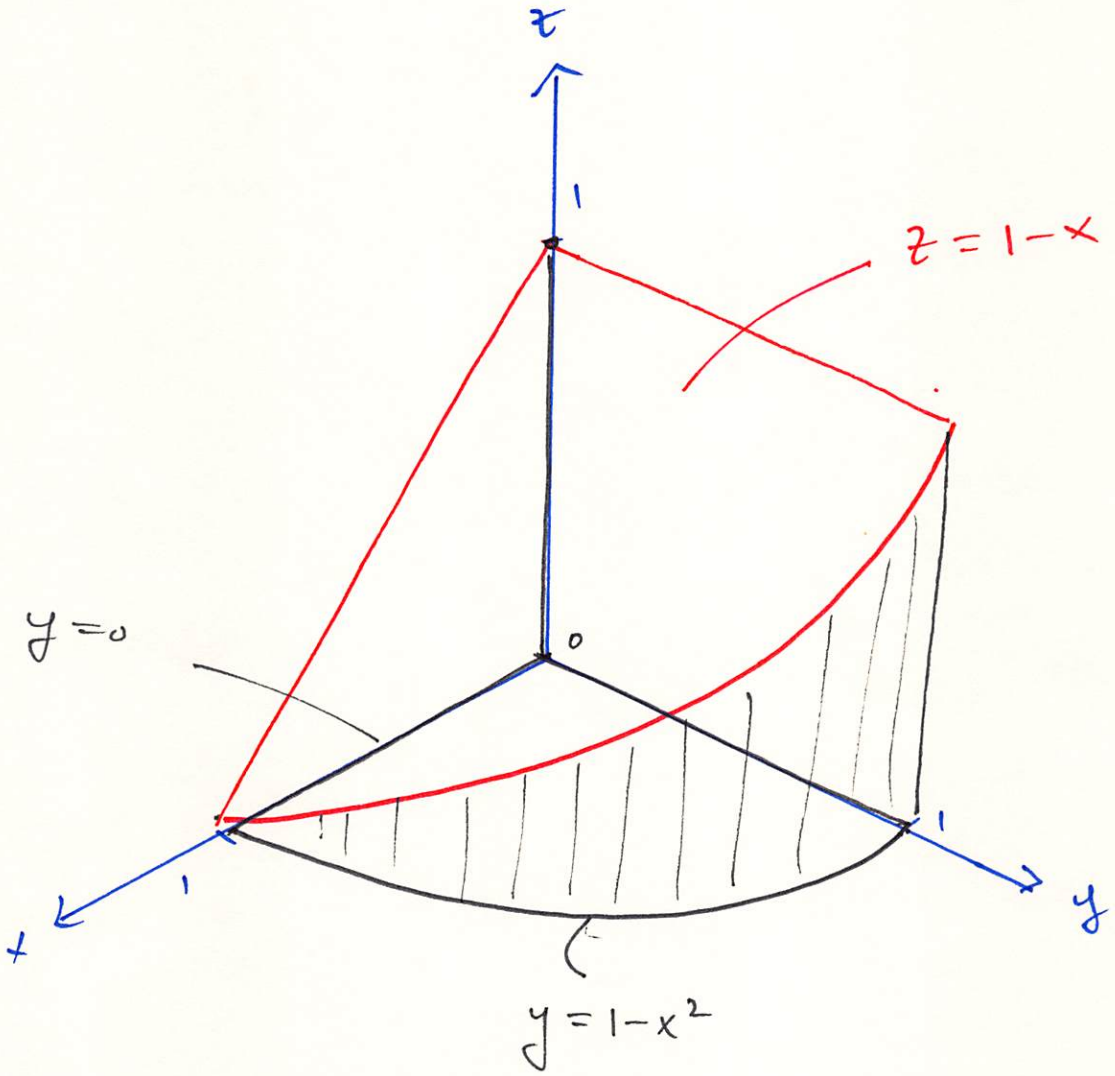
$$= \int_0^2 \int_0^{4-2x} 4 - 2x - y \, dy \, dx$$

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

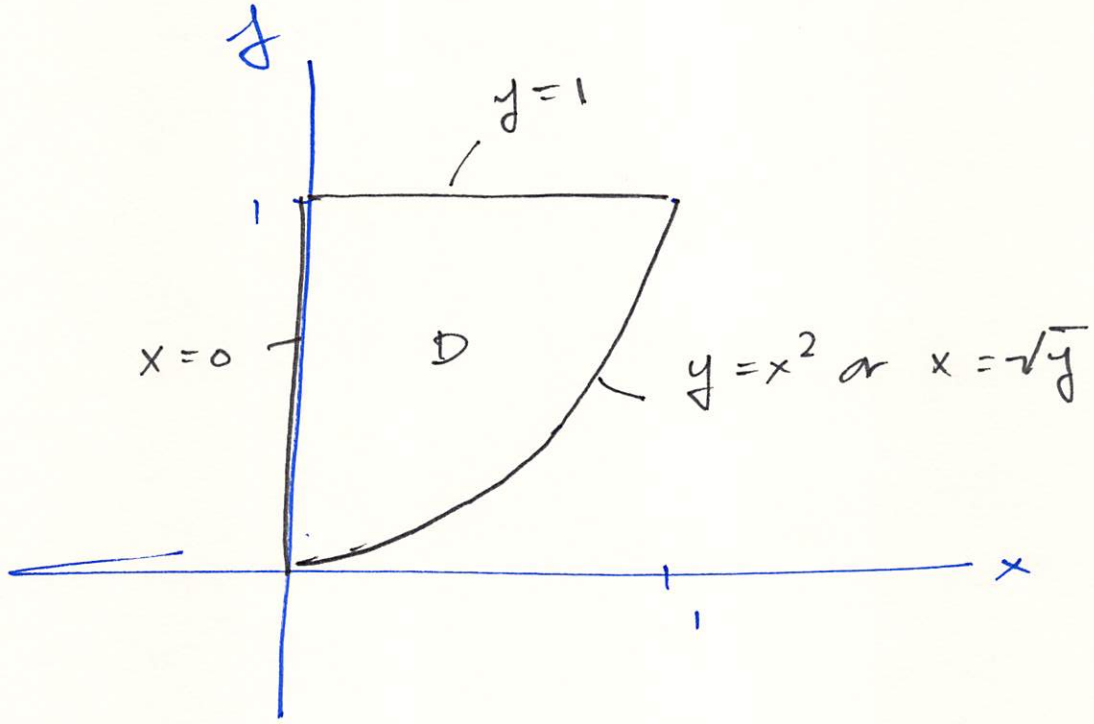
$$= \int_0^2 \frac{(4-2x)^2}{2} = 2\int_0^2 (x-2)^2 \, dx = 2 \cdot \int_{-2}^{0} x^2 \, dx$$

$$= 2 \cdot \frac{x^3}{3} \Big|_{-2}^{0} = \frac{16}{3}$$

#15.2.40 $\int_0^1 \int_0^{1-x^2} (1-x)\, dy\, dx$



#15.2.52 $\int_0^1 \int_{x^2}^1 \sqrt{y}\sin y \, dy\, dx$



$$= \int_0^1 \int_0^{\sqrt{y}} \sqrt{y}\sin y \; dx\,dy$$

$$= \int_0^1 y \cdot \sin y \, dy$$

y		$\sin y$
	$+$ ↘	
1		$-\cos y$
	$-$ ↘	
0		$-\sin y$

$$= -y\cos y + \sin y \Big|_0^1$$

$$= \sin 1 - \cos 1 - (0 + 0) = \sin 1 - \cos 1$$