3a $\displaystyle\int_0^2 \int_0^{\underset{2\cos\theta}{\underline{\sqrt{2x-x^2}}}} \sqrt{x^2+y^2}\, dy\, dx.$

$dA = dy\, dx$

$dA = r\, dr\, d\theta.$

Reescriba en términos de r 4 θ.

$\sqrt{x^2+y^2} = \sqrt{r^2} = r.$

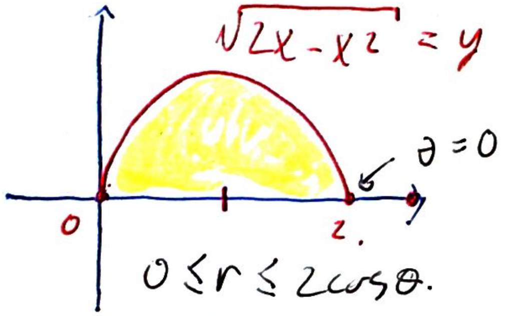
$\sqrt{2x-x^2} = \sqrt{2r\cos\theta - r^2\cos^2\theta}$

semi
círculo de radio
1 centrado en (1,0).

$0 \le x \le 2, \quad 0 \le y \le \sqrt{2x-x^2}$

$y^2 = 2x - x^2$ ó $\boxed{y^2 + x^2 - 2x} + 1 = 1$

$y^2 + (x-1)^2 = 1$



$2x - x^2 = 0$

$x(2-x) = 0$

$x = 0$ & $x = 2.$

$0 \le r \le 2\cos\theta.$

$0 \le \theta \le \pi/2.$

$y = \sqrt{2x-x^2}$

$y^2 = 2x - x^2.$

$r^2\sin^2\theta = 2r\cos\theta - r^2\cos^2\theta.$

$r^2 = 2r\cos\theta.$

$r = 2\cos\theta.$

$r = 2\cos\theta$

$r(0) = 2.$ $\quad r\left(\frac{\pi}{2}\right) = 0.$

$r(\pi) = -2.$

$0 \le \theta \le \pi/2 \qquad 0 \le r \le 2\cos\theta \qquad \sqrt{x^2+y^2} = r$

$$\int_0^{\pi/2}\int_0^{2\cos\theta} r^2\, dr\, d\theta. = \int_0^{\pi/2} \frac{r^3}{3}\Big]_0^{2\cos\theta} d\theta.$$

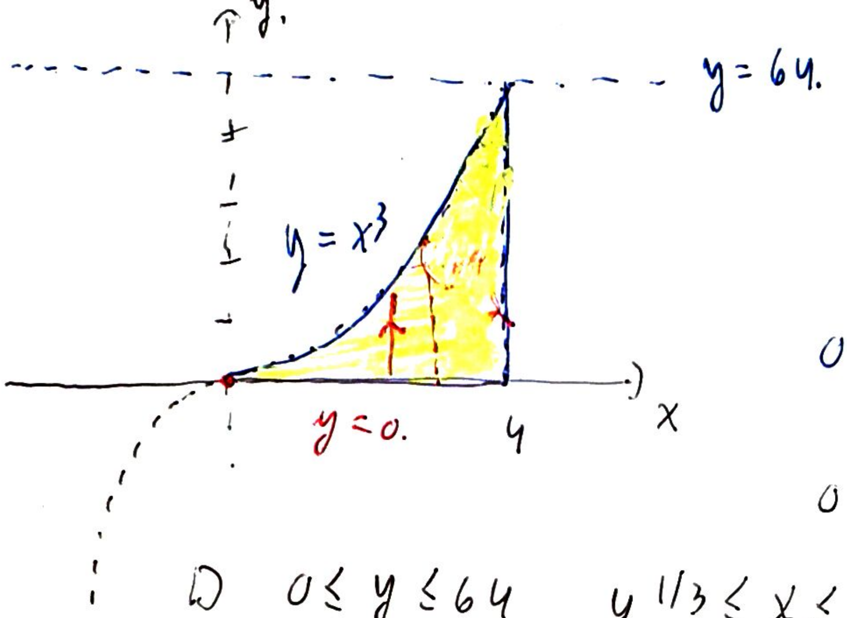
$(1-\sin^2\theta)\cos\theta.$

$$= \frac{8}{3}\int_0^{\pi/2} \cos^3\theta\, d\theta.$$

5a $\int_0^1 \int_{3y}^3 5e^{x^2}\,dx\,dy. \quad = \iint_D 5e^{x^2}\,dA.$

5b $\int_0^{64} \int_{\sqrt[3]{y}}^4 6e^{x^4}\,dx\,dy.$

$0 \le y \le 64$ $\qquad$ $\underline{\underline{y^{1/3} \le x \le 4.}}$



$x = 4$

$x = y^{1/3}.$

$y = x^3$

$0 \le y \le x^3.$

$x^3 = 0 \Rightarrow x = 0$

$0 \le x \le 4.$

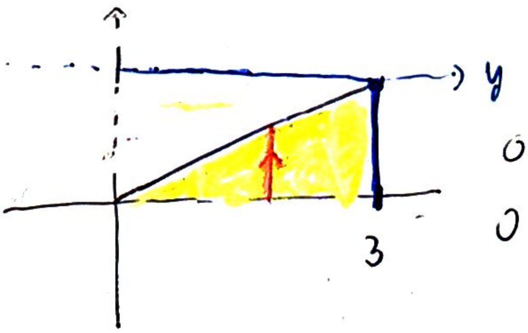
D $\quad 0 \le y \le 64 \quad y^{1/3} \le x \le 4$ } representan a la misma región.
ó $\quad 0 \le x \le 4 \quad 0 \le y \le x^3.$

$$\iint_D 6e^{x^4}\,dA. = \int_0^4 \int_0^{x^3} 64e^{x^4}\,dy\,dx.$$

$0 \le x \le 3y.$

$0 \le y \le 1$ $\qquad$ ó
$3y \le x \le 3.$

Grafique $\quad 0 = y \quad x = 3.$
$\qquad\qquad 1 = y \quad y = x/3.$



$0 \le x \le 3$

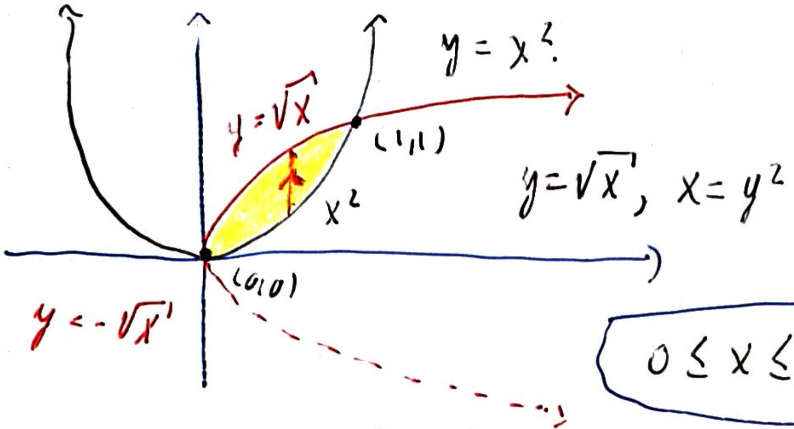
$0 \le y \le \frac{x}{3}.$

4a) debajo de la superficie $z = 7x+2y$.

y arriba de la región D. $y = x^2$ & $x = y^2$.

$$V = \iiint_E dV \qquad V = \iint_D z\, dA. = \iint_D (7x+2y)\, dA.$$

$$E: (x,y) \in D \qquad 0 \le z \le 7x+2y.$$



sólido debajo de $f(x,y)$ y encima de $g(x,y)$.

$$\boxed{0 \le x \le 1, \quad x^2 \le y \le \sqrt{x}}$$

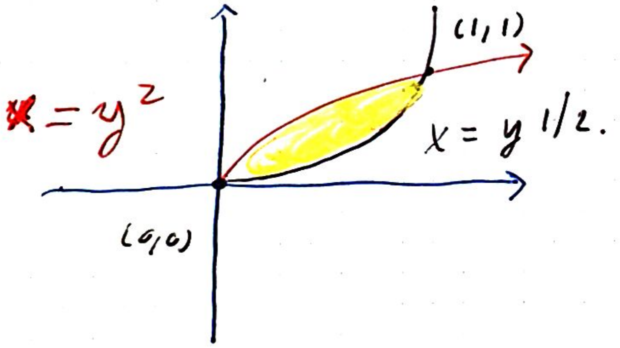
$$x^2 = x^{1/2}.$$

$$x^2 - x^{1/2} = 0.$$

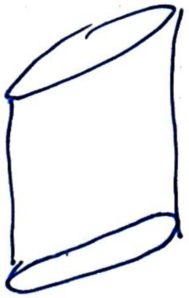
$$x^{1/2}(x^{3/2} - 1) = 0 \Rightarrow \quad x^{1/2} = 0.$$

$$x^{3/2} = 1$$

$$x = 1^{2/3} = 1$$



$$\boxed{0 \le y \le 1, \quad y^2 \le x \le \sqrt{y}}$$



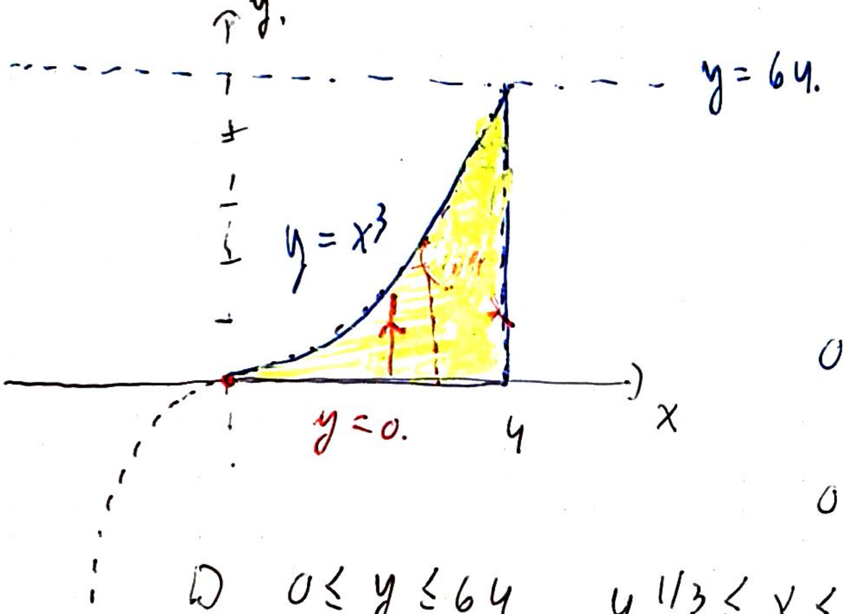
$$V = \int_0^1 \int_{y^2}^{\sqrt{y}} 7x+2y \, dx\, dy.$$

$$V = \int_0^1 \int_{x^2}^{\sqrt{x}} 7x+2y \, dy\, dx.$$

5a $\int_0^1 \int_{3y}^3 5e^{x^2}\,dx\,dy. = \iint_D 5e^{x^2}\,dA.$

5b $\int_0^{64} \int_{3\sqrt{y}}^4 6e^{x^4}\,dx\,dy.$

$0 \le y \le 64$ $\qquad$ $y^{1/3} \le x \le 4.$



$x = 4$

$x = y^{1/3}.$

$y = x^3$

$0 \le y \le x^3.$

$x^3 = 0 \Rightarrow x = 0$

$0 \le x \le 4.$

D $\quad 0 \le y \le 64 \qquad y^{1/3} \le x \le 4$

ó $\quad 0 \le x \le 4 \qquad 0 \le y \le x^3.$

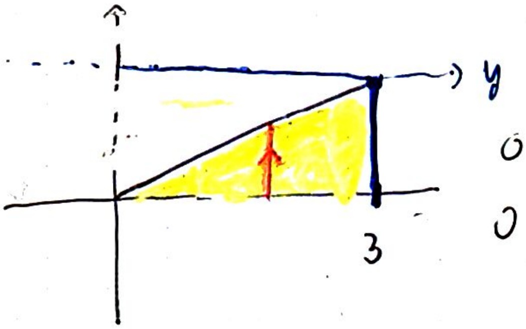
} representan a la misma región.

$$\iint_D 6e^{x^4}\,dA. = \int_0^4 \int_0^{x^3} 64e^{x^4}\,dy\,dx.$$

$0 \le x \le 3y.$

$0 \le y \le 1$ $\qquad$ ó

$3y \le x \le 3.$

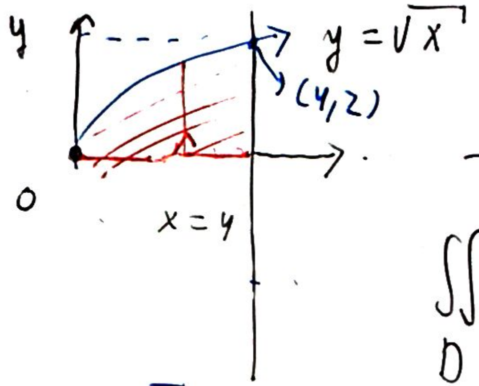


$0 \le x \le 3$

$0 \le y \le \frac{x}{3}.$

Grafique $\quad 0 = y \qquad x = 3.$

$\qquad\qquad 1 = y \qquad y = x/3.$



$0 \le x \le 4$

$0 \le y \le \sqrt{x}$

$$\iint_D y^2 \sqrt{x} \sin x \, dx$$

$$\int_0^4 \int_0^{\sqrt{x}} y^2 \boxed{\sqrt{x} \sin x} \, dy \, dx$$

$$\int_0^{\sqrt{x}} y^2 \, dy = \frac{y^3}{3}\Big]_0^{\sqrt{x}}$$

$$\int_0^4 x^{3/2} x^{1/2} \sin x \, dx = \int_0^4 x^2 \sin \underset{\searrow x^3 ?}{\boxed{x}} \, dx$$