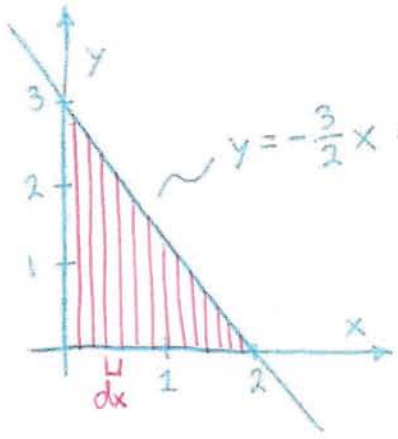
find the area described in the figure



area of enclosed triangle?

use columns of height y(x) and width dx

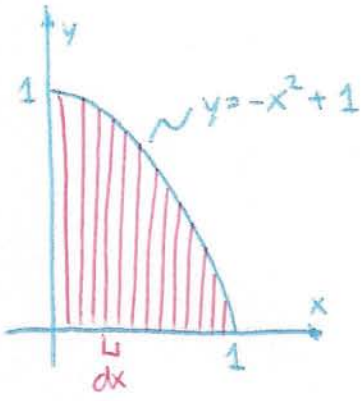
$$\text{Area} = \int_0^2 y(x)\,dx = \int_0^2 -\frac{3}{2}x + 3\,dx = \left[-\frac{3}{2}\left(\frac{1}{2}x^2\right) + 3x\right]_0^2$$

$$= \left[-\frac{3}{4}x^2 + 3x\right]_0^2 = \left[-\frac{3}{4}(2)^2 + 3(2)\right] - \left[-\frac{3}{4}(0)^2 + 3(0)\right]$$

$$= -3 + 6 = 3 \text{ units}^2$$

$$\boxed{\text{Area} = 3 \text{ units}^2}$$

find the area described in the figure



area of enclosed parabola

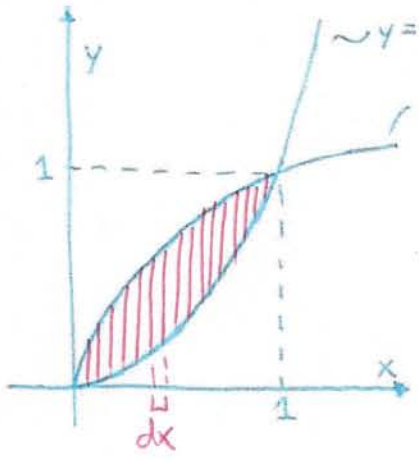
use columns of height $y(x)$ and width dx

$$\text{Area} = \int_0^1 y(x)\,dx = \int_0^1 (-x^2+1)\,dx = \left[-\tfrac{1}{3}x^3 + x\right]_0^1$$

$$= \left[-\tfrac{1}{3}(1)^3 + (1)\right] - \left[-\tfrac{1}{3}(0)^3 + (0)\right] = -\tfrac{1}{3} + 1 = \tfrac{2}{3}$$

$$\boxed{\text{Area} = \tfrac{2}{3} \approx 0.67 \text{ units}^2}$$

find the area described in the figure



$y = x^2 = y_1(x)$ area enclosed by $y = \sqrt{x} = y_2(x)$ $y = \sqrt{x}$ and $y = x^2$

use columns of height $(y_2 - y_1)$ and width dx

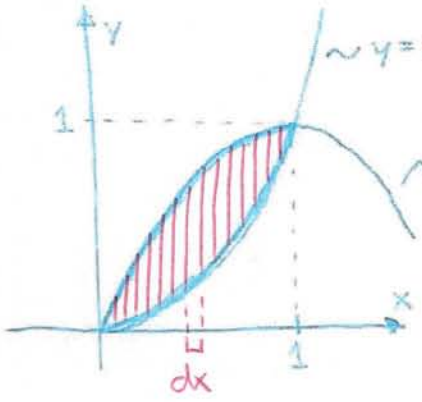
$$\text{Area} = \int_0^1 (y_2(x) - y_1(x))\,dx = \int_0^1 \sqrt{x} - x^2\,dx = \left[\frac{2}{3}x^{\frac{3}{2}} - \frac{1}{3}x^3\right]_0^1$$

$$= \left[\frac{2}{3}(1)^{\frac{3}{2}} - \frac{1}{3}(1)^3\right] - \left[\frac{2}{3}(0)^{\frac{3}{2}} - \frac{1}{3}(0)^3\right]$$

$$= \left[\frac{2}{3} - \frac{1}{3}\right] = \frac{1}{3} \approx 0.33 \text{ units}$$

$$\boxed{\text{Area} = \frac{1}{3} \approx 0.33 \text{ units}^2}$$

find the area described in the figure



$\sim y = x^2 = y_1(x)$

$\sim y = \sin\left(\frac{\pi}{2}x\right) = y_2(x)$

area enclosed by $y = \sin\left(\frac{\pi x}{2}\right)$ and $y = x^2$.

use columns of height $(y_2 - y_1)$ and width dx

$$\text{Area} = \int_0^1 \left(y_2(x) - y_1(x)\right) dx = \int_0^1 \left(\sin\left(\frac{\pi x}{2}\right) - x^2\right) dx$$

$$= \left[-\frac{2}{\pi}\cos\left(\frac{\pi x}{2}\right) - \frac{1}{3}x^3\right]_0^1$$

$$= \left[-\frac{2}{\pi}\cos\left(\frac{\pi(1)}{2}\right) - \frac{1}{3}(1)^3\right] - \left[-\frac{2}{\pi}\cos\left(\frac{\pi(0)}{2}\right) - \frac{1}{3}(0)^2\right]$$

$$= \left[0 - \frac{1}{3}\right] - \left[-\frac{2}{\pi}\right] = \frac{2}{\pi} - \frac{1}{3} \approx 0.30 \text{ units}^2$$

$$\boxed{\text{Area} = \frac{2}{\pi} - \frac{1}{3} \approx 0.30 \text{ units}^2}$$