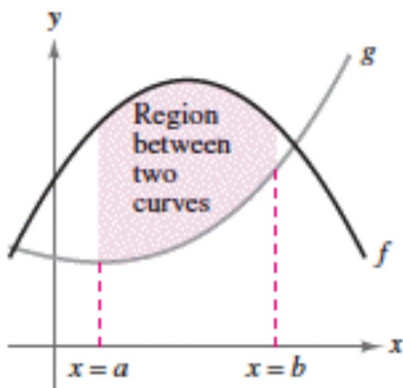


# 7.1

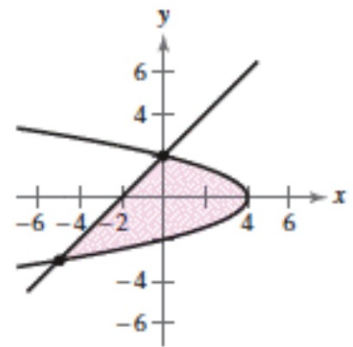
## Area of a Region Between Two Curves

- Find the area of a region between two curves using integration.
- Find the area of a region between intersecting curves using integration.



Top - Bottom

"x"



Right - Left

"y"

#1

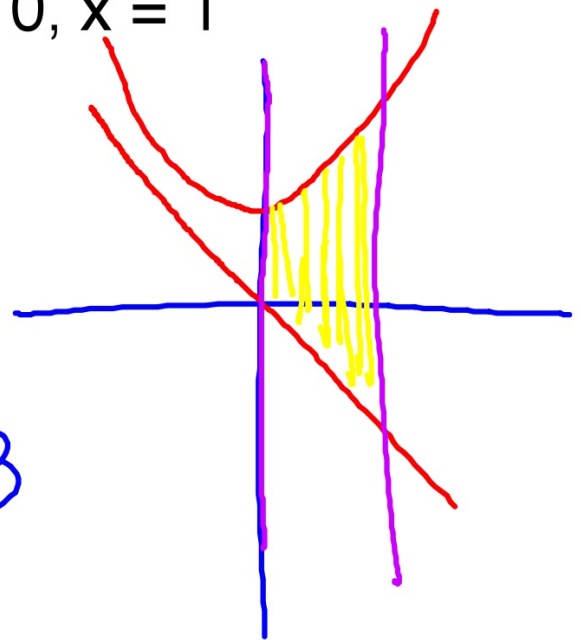
Find the area of the region bounded by the graphs of  $y = x^2 + 2$ ,  $y = -x$ ,  $x = 0$ , and  $x = 1$ .

$$y = x^2 + 2, y = -x, x = 0, x = 1$$

$$\int_0^1 (x^2 + 2 - (-x)) dx$$

$$\int_0^1 (x^2 + x + 2) dx$$

2.833



#2 Find the area of the region bounded by the graphs of  $f(x) = 2 - x^2$  and  $g(x) = x$ .

$$f(x) = 2 - x^2 \quad g(x) = x$$

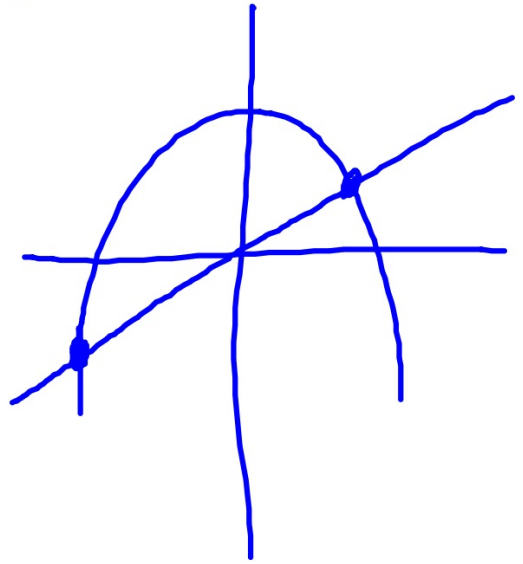
$$2 - x^2 = x$$

$$x^2 + x - 2 = 0$$

$$(x+2)(x-1) = 0$$

$$-2, 1$$

$$\int_{-2}^1 (2 - x^2 - x) dx = 4.5$$



#3  $f(y) = y(2 - y)$ ,  $g(y) = -y$

$$x = y(2 - y)$$

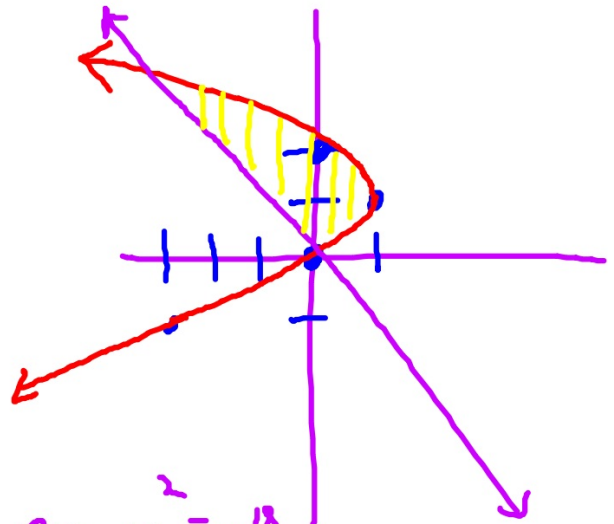
| x  | y  |
|----|----|
| 0  | 0  |
| -1 | -1 |
| -3 | -1 |
| 0  | 2  |

$$x = -y \Rightarrow y = -x$$

$$\int_0^3 (f(y) - g(y)) dy$$

$$\int_0^3 (2y - y^2 + y) dy$$

4.5



$$2y - y^2 = -y$$

$$3y - y^2 = 0$$

$$y(3 - y) = 0$$

#4

Find the area of the region between the graphs of  $f(x) = 3x^3 - x^2 - 10x$  and  $g(x) = -x^2 + 2x$ .

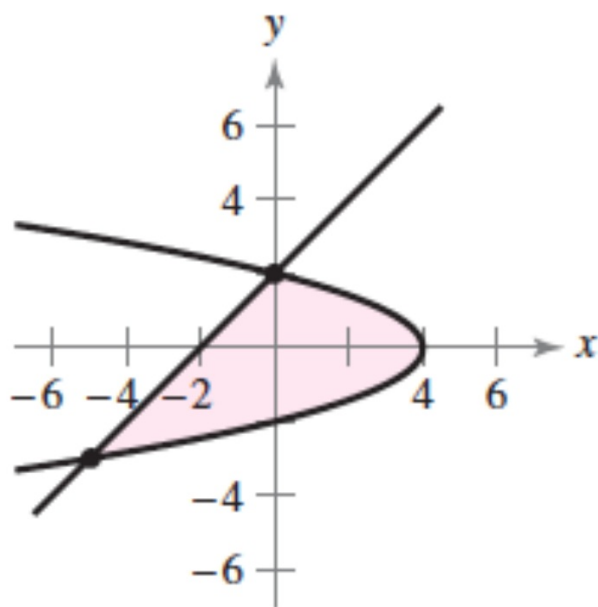
$$\int_{-2}^0 (f(x) - g(x)) dx + \int_0^2 (g(x) - f(x)) dx$$

$$12 + 12$$
$$24$$



$$x = 4 - y^2$$

$$x = y - 2$$



$$\int_{-3}^2 (4 - y^2 - (y - 2)) dy$$

$$\int_{-3}^2 (6 - y^2 - y) dy$$

The area of the first quadrant region bounded by the y-axis, the line  $f(x) = 4 - x$  and the graph of  $g(x) = x - \cos x$  is:

4.538

