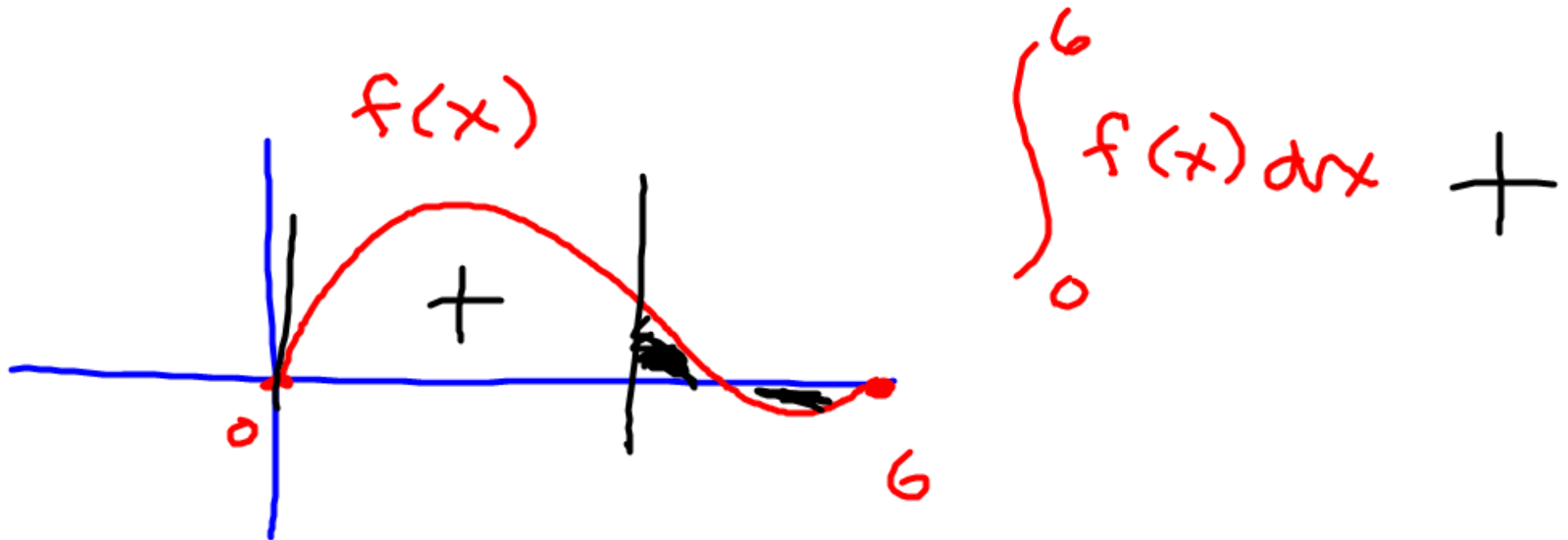
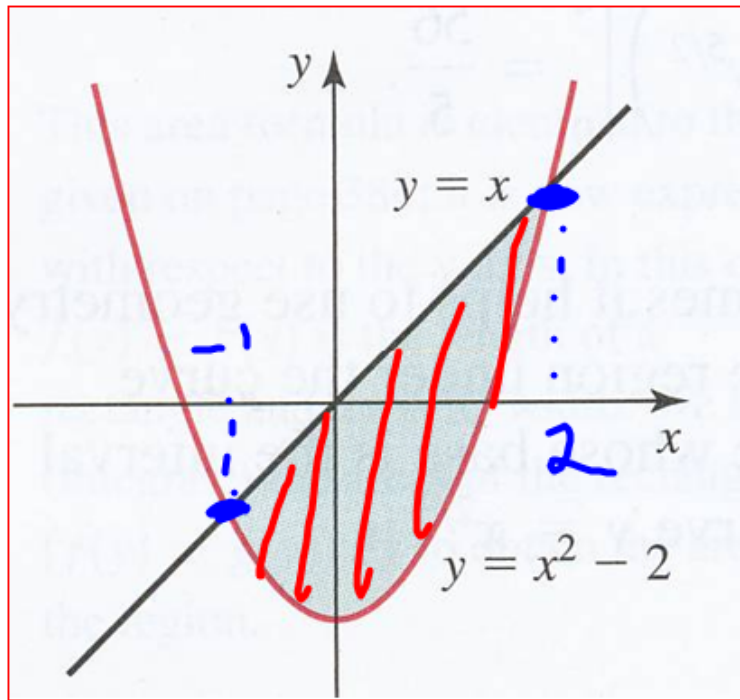


9.3 Area Between Two Curves



Find the total area of the shaded region.



Find the area enclosed by the two curves.

Limits \rightarrow Intersection Points

$$x^2 - 2 = x$$

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

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

$$x = 2$$

$$x = -1$$

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

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

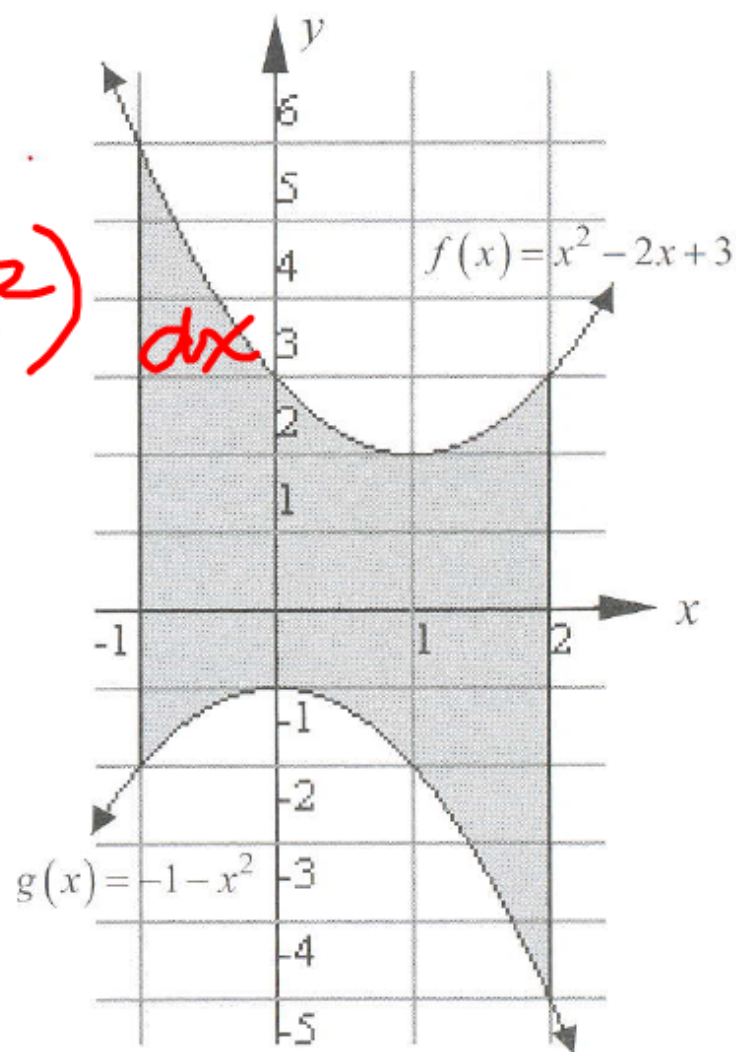
$$= 2 - \frac{8}{3} + 4 - \left[\frac{1}{2} + \frac{1}{3} - 2 \right]$$

$$= \frac{9}{2}$$

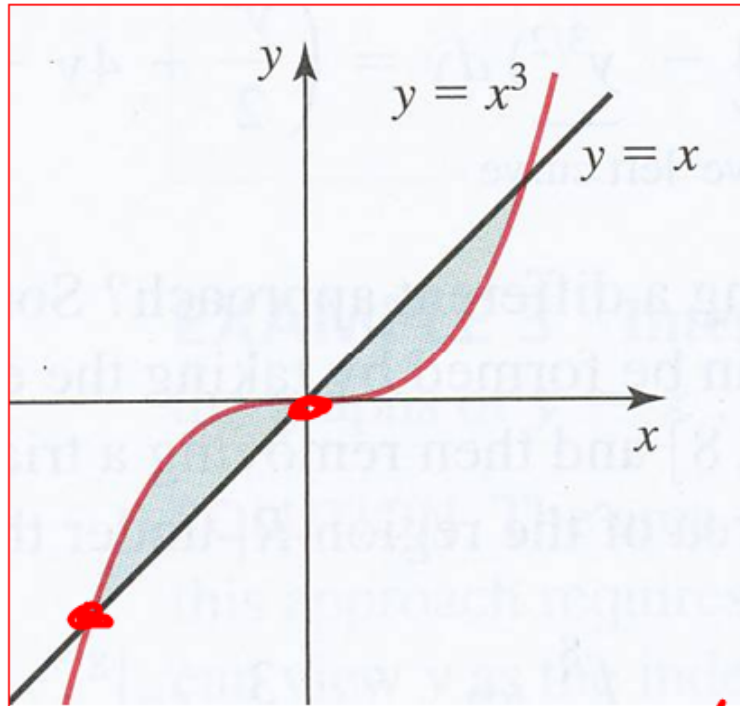
Example 1 Find the area of the region bounded by

$f(x) = x^2 - 2x + 3$, $g(x) = -1 - x^2$, and the lines $x = -1$ and $x = 2$.

$$\text{Area} = \int_{-1}^2 (x^2 - 2x + 3) - (-1 - x^2) dx = 15$$



Find the total area of the shaded region.



Int Points

$$x^3 = x$$

$$x^3 - x = 0$$

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

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

$$x = 0, 1, -1$$

$$\int_{-1}^0 (x^3 - x) dx + \int_0^1 (x - x^3) dx$$

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

Assignment
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#'s 1,2,3