

Homework 10

1. Find the area of the region.

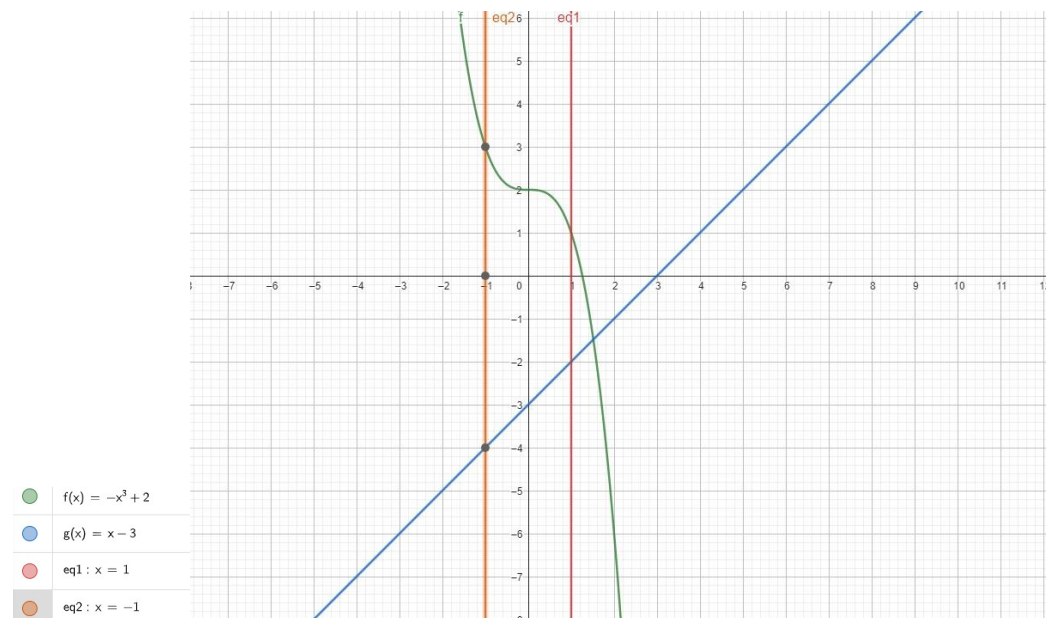
$$f(x) = -x^3 + 2, g(x) = x - 3, x = -1, x = 1$$

2. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 4$.

$$y = x, y = 3, x = 0$$

Sol :

1.



$$\begin{aligned} & \int_{-1}^1 (f(x) - 0) dx + \int_{-1}^1 (0 - g(x)) dx \\ &= \int_{-1}^1 (x^3 + 2) dx + \int_{-1}^1 (-x + 3) dx = 10 \end{aligned}$$

2.

$$\Leftrightarrow R(x) = 4 - x, r(x) = 1$$

$$v = \pi \int_0^3 ([R(x)]^2 - [r(x)]^2) dx,$$

$$v = \pi \int_0^3 ((4 - x)^2 - (1)^2) dx$$

$$= \pi \int_0^3 (x^2 - 8x + 15) dx$$

$$= 18\pi$$

