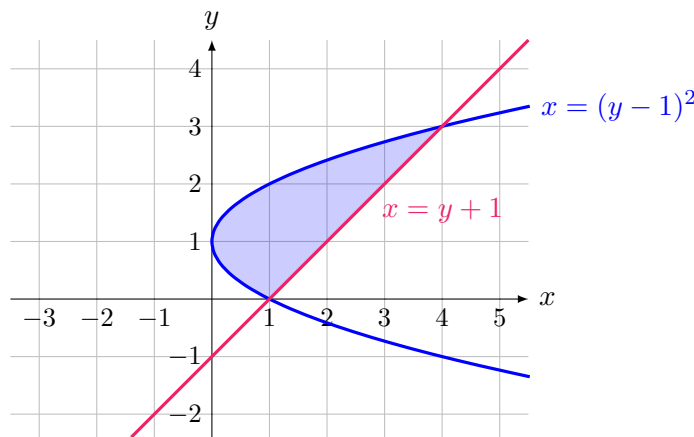


1. (a) Graph the region bounded between $x = (y - 1)^2$ and $y = x - 1$.



- (b) Set up an integral for the area of the region from part (a).

Solution: $\int_0^3 (y + 1) - (y - 1)^2 dy$

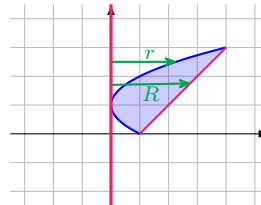
- (c) Set up an integral for the volume of the solid of revolution formed by rotating the region from part (a) about each of the lines below. **You do not have to evaluate the integral.**

- (i) y -axis

Solution: Use disks/washers.

Outer radius is $R = y + 1$. Inner radius is $r = (y - 1)^2$.

$$V = \int_0^3 \pi ((y + 1)^2 - (y - 1)^4) dy$$

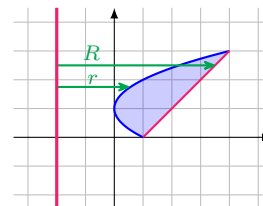


- (ii) $x = -2$

Solution: Use disks/washers.

Outer radius is $R = y + 3$. Inner radius is $r = (y - 1)^2 + 2$.

$$V = \int_0^3 \pi ((y + 3)^2 - ((y - 1)^2 + 2)^2) dy$$

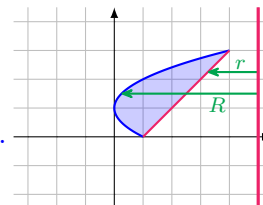


- (iii) $x = 5$

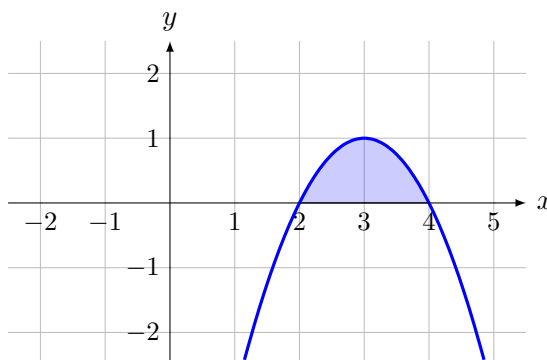
Solution: Use disks/washers.

Outer radius is $R = 5 - (y - 1)^2$. Inner radius is $r = 5 - (y + 1) = 4 - y$.

$$V = \int_0^3 \pi ((5 - (y - 1)^2)^2 - (4 - y)^2) dy$$



2. (a) Graph the region bounded between $y = -(x - 2)(x - 4)$ and the x -axis.



- (b) Set up an integral for the area of the region from part (a).

Solution: $\int_2^4 -(x - 2)(x - 4) dx$

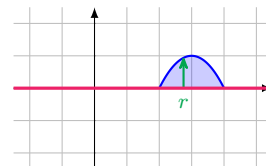
- (c) Set up an integral for the volume of the solid of revolution formed by rotating the region from part (a) about each of the lines below. **You do not have to evaluate the integral.**

- (i) x -axis

Solution: Use disks/washers.

Radius is $r = -(x - 2)(x - 4)$

$$V = \int_2^4 \pi (-(x - 2)(x - 4))^2 dx$$

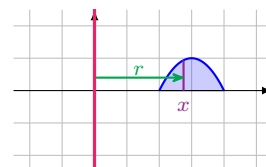


- (ii) y -axis

Solution: Use shells.

Radius is $r = x$ and height is $h = -(x - 2)(x - 4)$.

$$V = \int_2^4 2\pi x (-(x - 2)(x - 4)) dx$$



- (iii) $x = -1$

Solution: Use shells.

Radius is $r = x + 1$ and height is $h = -(x - 2)(x - 4)$.

$$V = \int_2^4 2\pi (x + 1) (-(x - 2)(x - 4)) dx$$

