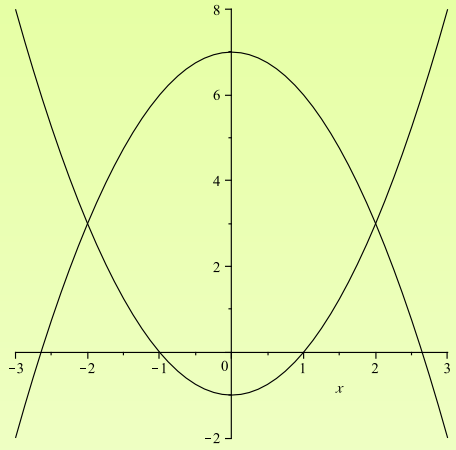
1. $y = x^2 - 1$ and $y = 7 - x^2$

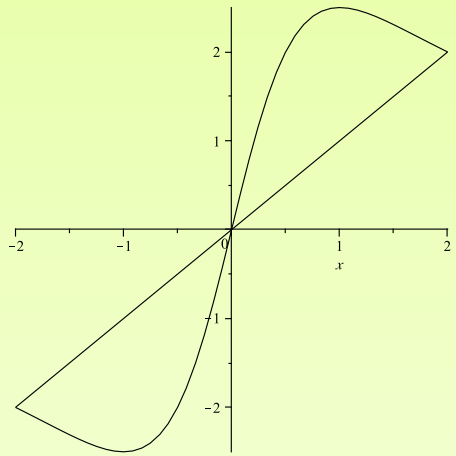


Intersection points:

$$\begin{aligned} x^2 - 1 &= 7 - x^2 \\ \Rightarrow 2x^2 &= 8 \\ \Rightarrow x^2 &= 4 \\ \Rightarrow x &= \pm 2. \end{aligned}$$

$$\begin{aligned} \text{Area} &= \text{upper area} - \text{lower area} \\ &= \int_{-2}^{2} 7 - x^2 \, dx - \int_{-2}^{2} x^2 - 1 \, dx \\ &= 2\int_{0}^{2} (7 - x^2) - (x^2 - 1) \, dx \\ &= 2\int_{0}^{2} 8 - 2x^2 \, dx = 2\left(8x - \frac{2}{3}x^3\right)\Big|_0^2 \\ &= 2\left(\left(16 - \frac{16}{3}\right) - 0\right) = \frac{64}{3} \end{aligned}$$

2. $y = \frac{5x}{x^2+1}$ and $y = x$



Intersection points:

$$\begin{aligned} \frac{5x}{x^2+1} &= x \\ 5x &= x^3 + x \\ 0 &= x^3 - 4x \\ 0 &= x(x-2)(x+2) \end{aligned}$$

$x = -2$, $x = 0$, and $x = 2$.

$$\begin{aligned} \text{Area} &= 2\int_0^2 \frac{5x}{x^2+1} - x\, dx \\ &= 2\left(\frac{5}{2}\ln|x^2+1| - \frac{1}{2}x^2\right)\Big|_0^2 \\ &= \big(5\ln(5) - 4\big) - (0) \end{aligned}$$