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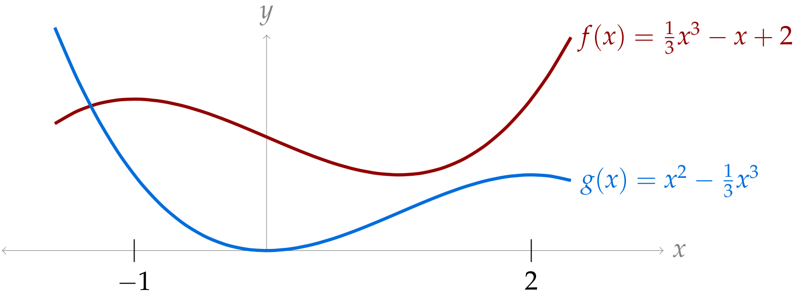
Find the area between $f(x)$ and $g(x)$ from $x = -1$ to $x = 2$.

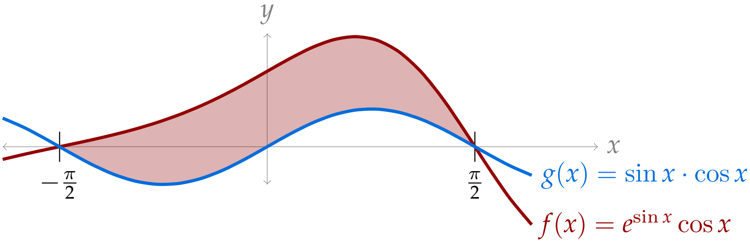


$$= \int_{-1}^{2} \left[\frac{1}{3}x^3 - x + 2 - x^2 + \frac{1}{3}x^3\right] \mathrm{d}x$$

$$= \int_{-1}^{2} \left[\frac{2}{3}x^3 - x^2 - x + 2\right] \mathrm{d}x$$

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

Find the (unsigned) area between $f(x)$ and $g(x)$ from $x=-\frac{\pi}{2}$ to $x=\frac{\pi}{2}$.



$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left[f(x) - g(x)\right] \mathrm{d}x = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(e^{\sin x}\cos x - \sin x \cos x\right) \mathrm{d}x$$

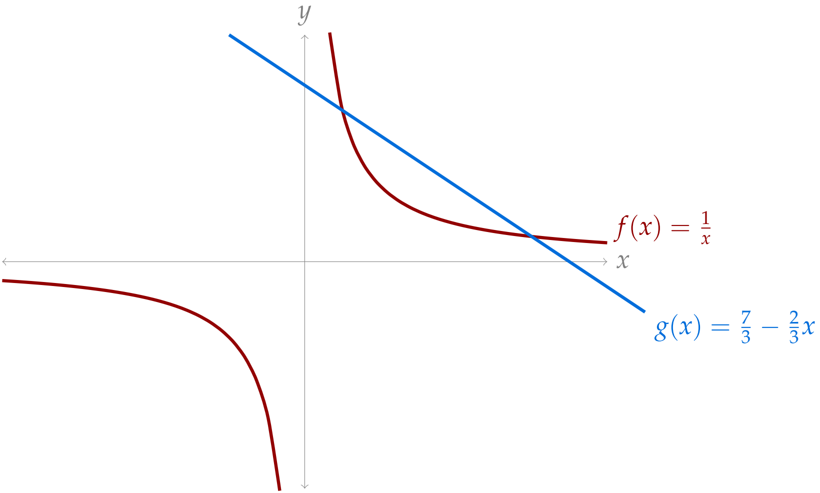
Let $u = \sin x$.

Then: $\mathrm{d}u = \cos x \, \mathrm{d}x$, $u\left(\frac{\pi}{2}\right) = \sin\left(\frac{\pi}{2}\right) = 1$, $u\left(\frac{-\pi}{2}\right) = \sin\left(\frac{-\pi}{2}\right) = -1$.

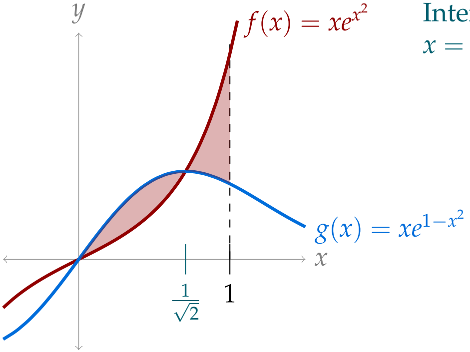
$$= \int_{-1}^{1} \left(e^u - u\right) \mathrm{d}u$$

$$= \left[e^u - \frac{1}{2}u^2\right]^1$$

Find the (unsigned) area of the finite region bounded by $f(x)$ and $g(x)$.



Find the (unsigned) area in the figure below between the curves $f(x)$ and $g(x)$ from $x = 0$ to $x = 1$.



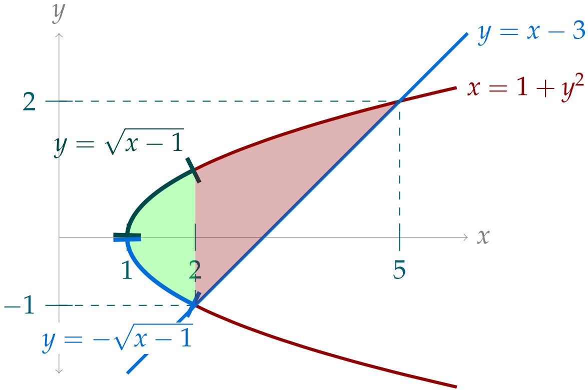
Intersections at $x = 0$ and $x = \pm\frac{1}{\sqrt{2}}$:

$$\begin{aligned} xe^{x^2} &= xe^{1-x^2} \\ e^{x^2} &= e^{1-x^2} \text{ or } x = 0 \\ x^2 &= 1 - x^2 \\ x &= \pm\frac{1}{\sqrt{2}} \end{aligned}$$

$$\text{Area} = \int_0^{\frac{1}{\sqrt{2}}} \left[g(x) - f(x)\right] \mathrm{d}x + \int_{\frac{1}{\sqrt{2}}}^1 \left[f(x) - g(x)\right] \mathrm{d}x$$

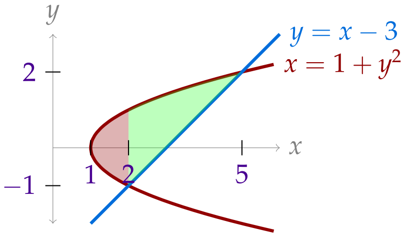
$$= \int_0^{\frac{1}{\sqrt{2}}} \left[xe^{1-x^2} - xe^{x^2}\right] \mathrm{d}x + \int^1 \left[xe^{x^2} - xe^{1-x^2}\right] \mathrm{d}x$$

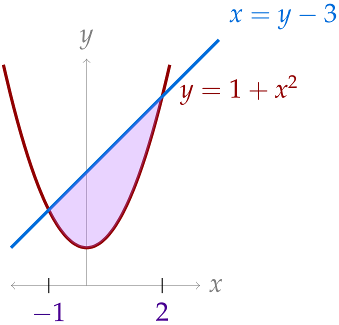
Set up, but do not evaluate, integral(s) to find the (unsigned) area of the finite region bounded by $x = 1 + y^2$ and $y = x - 3$.



Option 1: $$\int_1^2 \left[\sqrt{x-1} - \left(-\sqrt{x-1}\right)\right] \mathrm{d}x + \int_2^5 \left[\sqrt{x-1} - (x-3)\right] \mathrm{d}x$$

Set up, but do not evaluate, integral(s) to find the (unsigned) area of the finite region bounded by $x = 1 + y^2$ and $y = x - 3$.





$$\int_{-1}^{2} \left[(x+3) - (1+x^2)\right] \mathrm{d}x$$

ans