1. (2.5 pts) Find the area of the region enclosed by the curves $y = x^2$ and $y = 3x$.
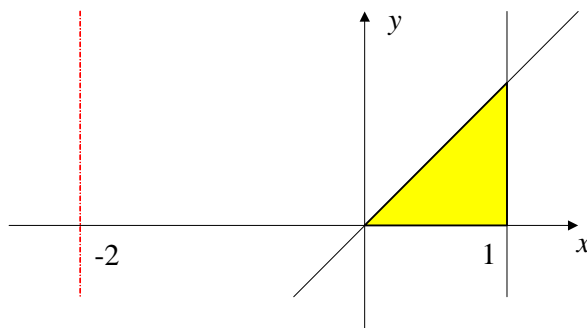
   Solution: Let $x^2 = 3x$. $x^2 - 3x = 0$. $x = 0$ or $x = 3$.

   $$\begin{aligned}
   V &= \int_0^3 \left(3x - x^2\right) dx \\
   &= \left[\frac{3}{2}x^2 - \frac{x^3}{3}\right]_0^3 \\
   &= \frac{3}{2} \cdot 9 - \frac{27}{3} \\
   &= \frac{9}{2}.
   \end{aligned}$$

   □

2. (2.5 pts) Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the curves $y = x$, $x = 1$ and $y = 0$ about $x = -2$.

   Solution:

   $$\begin{aligned}
   V &= \int_0^1 \pi \left[(1 - (-2))^2 - (y - (-2))^2\right] dy \\
   &= \int_0^1 \pi \left[3^2 - (y + 2)^2\right] dy
   \end{aligned}$$

   □