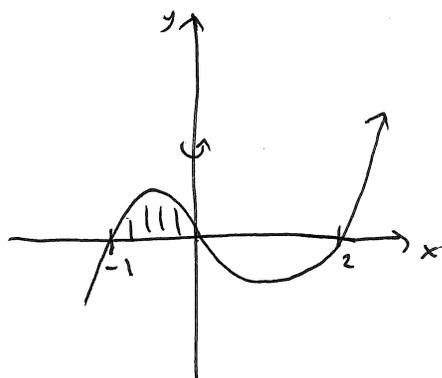


Quiz 7

Name: Solution Key

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. Find the volume of the solid of revolution generated by rotating the region bounded by $y = x^3 - x^2 - 2x$, $y = 0$, $x = -1$, and $x = 0$ around the y -axis. You may want to sketch the region being rotated.



Use shells:

$$r = 0 - x = -x$$

$$h = x^3 - x^2 - 2x$$

$$\begin{aligned}
 V &= \int_{-1}^0 (2\pi)(-x)(x^3 - x^2 - 2x) dx \\
 &= 2\pi \int_0^{-1} x^4 - x^3 - 2x^2 dx \\
 &= 2\pi \left(\frac{1}{5}x^5 - \frac{1}{4}x^4 - \frac{2}{3}x^3 \right) \Big|_0^{-1} \\
 &= 2\pi \left(-\frac{1}{5} + \frac{1}{4} + \frac{2}{3} \right) \\
 &= 2\pi \left(\frac{-12 - 15 + 40}{60} \right) \\
 &= \frac{13\pi}{30}
 \end{aligned}$$