

Practice Exam 3

- Sketch the region to the right of the y -axis bounded by $y = (x^2 - 1)^2$ and $y = 9$.
 - Use the shell method to find the volume of the solid generated by rotating this region around the y -axis.
 - Find the same volume using the disk method.
- A 200-gallon bathtub initially full of springs develops a leak at the bottom. 20% of the water leaks out in the first five minutes. How much water is left in the bathtub after t minutes if
 - the water drains off at a rate proportional to the amount of water present.
 - the water drains off at a rate proportional to the time elapsed times the amount of water present, as might happen if the hole in the bottom were growing.
- Suppose that $y' - \frac{2}{x}y = \frac{1}{x}$ and when $x = 1$, $y = \frac{5}{2}$.
 - Solve the equation using an integrating factor.
 - The equation happens to be separable. Solve it by separating the variables. Hint: Start by getting all the terms containing x on one side and factoring out $\frac{1}{x}$.
 - Show that your answer is a solution to the original equation.