Mth134 – Calculus II – **Practice Exam 2**

NOTE: This exam should not be taken as a complete list of possible problems. It is merely intended to be an example of the length and difficulty level of the regular exam. To best utilize it as a *practice* exam, give yourself 55 minutes with no distractions. Try to emulate the classroom environment as much as possible.

1. Solve the differential equation $y' = xy$. Simplify your answer so it is of the form $y = f(x)$.

2. Find the area of the region bounded by the graphs of $x = y^2$ and $x = 1$.

3. **SET UP** a definite integral to find the volume of the solid generated by revolving the region bounded by $y = x^2$ and $y = 4x - x^2$ about the line $x = 4$. You do not need to simplify the integrand.

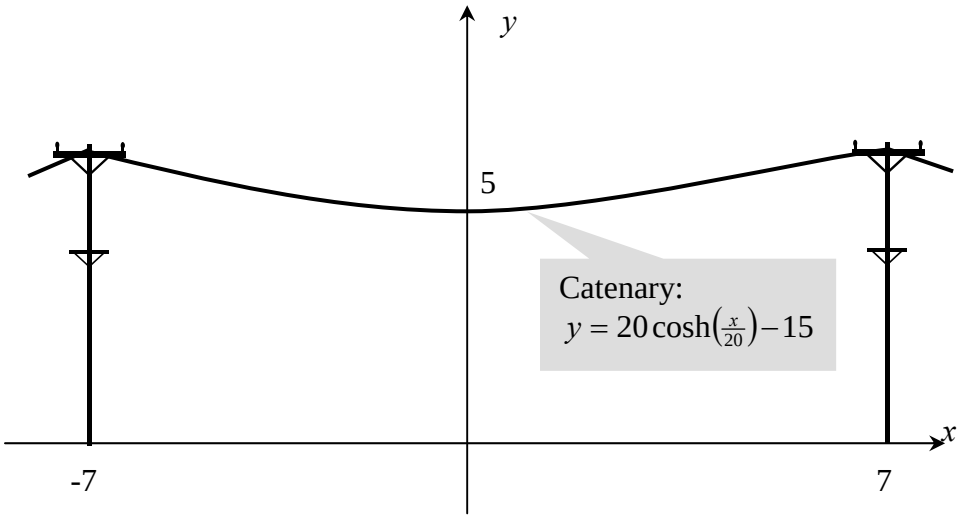
4. Find the volume of the solid formed by revolving the region bounded by the graph of $f(x) = \sqrt{\sin x}$ and the x-axis $(0 \le x \le \pi)$ about the x-axis.

5. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^2 + 1$, $y = 0$, $x = 0$, and $x = 1$ about the y-axis.

6. Find the area of the surface generated by revolving the curve $y = x^2 \ \left(0 \le x \le 1\right)$ about the y-axis.

7. Consider a 15-ft chain that weighs 3 pounds per foot hanging from a winch 15 feet above ground level. Find the work done by the winch in winding up all but 5 ft of the chain. (To be clear, this means that 5 ft of chain will still be remaining and10 ft will be wound up on the winch.)

8. A telephone line hangs between two poles 14m apart in the shape of the catenary $y = 20\cosh\left(\frac{x}{20}\right) - 15$, where x and y are measured in meters. Find the length of cable (arc length) between the two towers. (Hint: $1 + \sinh^2 x = \cosh^2 x$)



9. Find the center of mass $(\bar{x}, \bar{y})$ for the lamina of uniform density ρ bounded by the graphs of the equations $y = x^2$ and $y = 1$.

10. Find the fluid force on the vertical side of the tank shown below, where the dimensions are given in feet. Assume that the tank is full of water. (Note: The density of water is 62.4 lb/ft^3.)