1. (6 pts) Answer the following:
   a. Describe what the equation $y = \sqrt{x}$ represents in $\mathbb{R}^2$. Draw a sketch.
   b. Describe what the equation $y = \sqrt{x}$ represent in $\mathbb{R}^3$. Draw a sketch.

2. (6 pts) Answer the following:
   a. Describe what the equation $y = \sin x$ represent in $\mathbb{R}^2$. Draw a sketch.
   b. Describe what the equation $y = \sin x$ represent in $\mathbb{R}^3$. Draw a sketch.
3. (3 pts) Next to each equation write the figure number that labels the correct graph of the equation.

\[
\frac{x^2}{25} + \frac{y^2}{25} + \frac{z^2}{100} = 1 \quad \frac{x^2}{25} + \frac{y^2}{25} = \frac{z^2}{4} \quad x^2 + y^2 = 9
\]

![Figure 1](image1.png)  ![Figure 2](image2.png)  ![Figure 3](image3.png)  ![Figure 4](image4.png)

4. (10 pts) Follow the steps in order to identify the Quadric Surface.
   a. Reduce the equation to one of the standard forms. (See Ex. 2–11.6)
      
      \[16x^2 - y^2 + 16z^2 = 4\]

   b. Describe the trace curves in the coordinate planes:
      i. XY-trace :

      ii. XZ-trace :

      iii. YZ-trace :

   c. Classify the Quadric Surface (name the surface):
5. (4 pts) Find an equation for the surface of revolution formed by revolving the curve $z^2 = 2y$ in the $yz$-plane about the $y$-axis.

6. (6 pts) Use the Shell Method to find the volume of the solid described below the surface of revolution and above the $xy$-plane.

   The curve $z = \sin y$ ($0 \leq y \leq \pi$) in the $yz$-plane is revolved about the $z$-axis.