1. (3) Find the average value of the function

\[ f(x) = \frac{x}{(x^2 + 1)^2} \]

over the interval [1, 3].

2. (3) Find the area of the region bounded by \( y = x^2 \) and \( y = x^4 \).

3. (4) Set up integrals to find the volume of the solid generated by revolving the region in the first quadrant bounded by \( y = x^2 \), \( y = 4 \), and the \( y \)-axis about

   (a) the \( y \)-axis
   (b) \( y = 4 \)