1. The number of bird nests in a coastal wetland is approximately \( f(x) = x(6 - x) \) nests per square mile for \( 0 \leq x \leq 6 \) where \( x \) is the distance in miles from the coast.
   a. Set up an integral that represents the total number of nests in a rectangular area 20 miles along the coast and 6 miles inland from the coast to dryer ground.
   b. Evaluate this integral.

2. Find the volume of the solid obtained by rotating the region bounded by the lines
   
   \[ y = 3 - x, \quad y = 1, \quad x = 0, \quad \text{and} \quad x = 1 \]

   about the \( x \)-axis.

3. Some gasoline is stored in a cylindrical container 1.5 feet high and 3 feet in circumference. Recall that the pressure of the gasoline at a depth of \( y \) feet from the top of the container is \( 42y \) lb/ft\(^2\). Find the total force on the side on the container.

4. The probability distribution \( p(x) \) is given by
   
   \[ p(x) = \frac{2}{9}x \quad \text{for} \quad 0 \leq x \leq 3. \]

   a. What is the probability that \( x \) lies between 1 and 2?
   b. What is the median value of \( x \)?
   c. What is the mean value of \( x \)?

5. Find the Taylor polynomial of degree 4 approximating
   
   \[ f(x) = x - \ln(1 + x) \quad \text{for} \quad x \text{ near } 0. \]

   Use your answer to find
   
   \[ \lim_{x \to 0} \frac{x - \ln(1 + x)}{x^2}. \]