Section 9.3

1. Find the length of the curve \( y = 2x^{3/2}, \ 0 \leq x \leq \frac{1}{4}, \)

2. Find the length of the curve \( x = \ln(\cos y), \)
   \[ 0 \leq y \leq \frac{\pi}{4}, \]

3. Find the length of the parametric curve \( x = 3t - t^3, \)
   \[ y = 3t^2, \ 0 \leq t \leq 2. \]

4. Find the length of the curve \( y = x^2 - \frac{\ln(x)}{8}, \) from \( x = 1 \) to \( x = e. \)

Section 9.4

5. Find the surface area obtained by revolving the given curve about the indicated axis.
   a.) \( y = 2x^3, \ 0 \leq x \leq 1 \) about the \( x \) axis.
   b.) \( y^2 = x + 2, \ 1 \leq y \leq 3 \) about the \( x \) axis.
   c.) \( y = x^2 + 1, \ 0 \leq x \leq 1, \) about the \( y \) axis.
   d.) \( y = \sqrt{4x}, \ 0 \leq x \leq 1, \) about the \( x \) axis.
   e.) \( x = \ln(3y + 1), \ 0 \leq y \leq 2, \) about the \( y \) axis. Set up a \( dx \) integral and a \( dy \) integral. Do not evaluate either integral.
   f.) \( x = 3t - t^3, \ y = 3t^2, \ 0 \leq t \leq 2, \) about the \( y \) axis.

Section 9.5

6. Find the centroid of the system consisting of the masses 1 g, 3 g and 7 g located at the points \((-2, 3), \)
   \((5, 1)\) and \((6, -3), \) respectively.

7. Find the centroid of the region bounded by \( y = e^x, \)
   \[ x = 0, \ x = 3 \ \text{and} \ y = 0. \]

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