1. Determine the slope-intercept form of the tangent line to the function \( y = f(x) \) at the indicated point \( P \).

   (a) \( f(x) = x \ln(x), \ P(e^{-1}, f(e^{-1})) \)
   (b) \( f(x) = e^{\sec(2x)}, \ P\left(\frac{\pi}{6}, f\left(\frac{\pi}{6}\right)\right) \)
   (c) \( g(x) = \arctan\left(\frac{\pi}{4}\right), \ P(\sqrt{3}, g(\sqrt{3})) \)
   (d) \( p(x) = 4\cos(x), \ P\left(\frac{\pi}{3}, p\left(\frac{\pi}{3}\right)\right) \)

2. Evaluate the integrals.

   (a) \( \int_{2\sqrt{3}}^{0} \frac{dx}{x^2+1} \)
   (b) \( \int_{3/2}^{0} \frac{dx}{\sqrt{9-x^2}} \)
   (c) \( \int_{0}^{3} \frac{dx}{x^2+1} \)
   (d) \( \int_{0}^{\pi/6} \frac{2x dx}{\sqrt{9-x^2}} \)
   (e) \( \int_{\pi/4}^{\pi/2} \csc(x) \cot(x) dx \)
   (f) \( \int_{\pi/3}^{e} \ln(x) \frac{dx}{x^2} \)
   (g) \( \int_{0}^{1} \frac{dx}{\sqrt{3-x^2+2x}} \)
   (h) \( \int_{1}^{2} \frac{dx}{\sqrt{3-x^2}} \)
   (i) \( \int_{0}^{\pi/6} \sec(2x) dx \)
   (j) \( \int_{0}^{1} \frac{dx}{x \cot(x^2)} \)
   (k) \( \int_{1/3}^{\pi/2} \frac{dx}{\tan(\pi x)} \)
   (l) \( \int_{1/4}^{1} \frac{dx}{\tan^{2}(\pi x)} \)
   (m) \( \int_{0}^{\pi/2} \frac{dx}{\sin(x)} \)
   (n) \( \int_{0}^{1} x(2x^2) dx \).

3. Sketch and shade the region that is bounded by the graphs of the given equations.

   Then determine the area of the region.

   (a) \( y = \frac{1}{y^2+x}, \ y = 0, \ x = 0, \ x = 3 \)
   (b) \( y = e^{2x}, \ y = 0, \ x = 0, \ x = \ln(3) \)
   (c) \( y = 3^x, \ y = 0, \ x = 1, \ x = 2 \)

4. Determine the values of \( c \) that satisfy the Mean Value Theorem for the given function in the indicated interval.

   (a) \( f(x) = \frac{2x-1}{x^3}, \ c \in [0, 2] \)
   (b) \( f(x) = \arcsin(2x), \ c \in [0, \frac{1}{2}] \)
   (c) \( f(x) = \ln(x), \ c \in [1, e] \)
   (d) \( f(x) = 10^x, \ c \in [0, \log(2)] \)

5. Sketch and shade the region bounded by the graphs of \( y = 9^x, \ y = 0, \ x = 0 \) and \( x = \frac{1}{2} \).

   A solid is generated when the region is revolved about the \( x \)-axis. Determine the volume of the solid.

6. Sketch and shade the region bounded by the graphs of \( y = e^{-x}, y = 0, x = 0 \) and \( x = 100 \).

   A solid is generated when the region is revolved about the \( x \)-axis. Determine the volume of the solid.