1. The graph of \( f \) is shown below. Let \( F \) be an antiderivative of \( f \) with \( F(0) = 1 \). On the axes provides, sketch the graph of \( F \). Label the critical points and inflection points of \( F \).

2. Compute the following antiderivatives.

   (a) \( \int \frac{4}{\sqrt{x}} \, dx \)
   
   (b) \( \int 3 \cos(x) - 2 \sin(x) \, dx \)
   
   (c) \( \int \frac{x^4 - 3x + 2}{x^{1/2}} \, dx \)
   
   (d) \( \int (x - 2)(3x + 1) \, dx \)

3. Compute the following definite integrals.

   (a) \( \int_0^1 x^4 - 3x + 1 \, dx \)
   
   (b) \( \int_e^{e^2} \frac{1}{x} \, dx \)
   
   (c) \( \int_0^{\pi/3} \sin(x) \, dx \)

4. Suppose a population of squirrels in a certain area is growing at a rate of \( 10e^t \) squirrels per month, and that initially there are 50 squirrels. Find the population \( P(t) \) of squirrels in month \( t \). What is the squirrel population after 1 month?

5. Find the exact area of the region between the curve \( y = x^2 + 1 \) and the line \( y = x + 3 \). Hint: First determine where the curves cross, and then think of the area as a difference of two areas.