Warm-up Problems

1. Let \( f(x) = x^3 - 2x - 5 \). Find
   
   (a) \( f(0) = \)
   
   (b) \( f(3) = \)

   What does this mean (if anything) about roots of \( f \)?

2. Given the line
   \[
   y - y_0 = m(x - x_0)
   \]

   Find a formula for where this line crosses the \( x \)-axis.

Lecture Problems

3. Use the formula \( x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)} \) to approximate the roots to the functions. Use the starting \( x_1 \) and find \( x_2, x_3 \).
   
   (a) \( f(x) = x^2 - 2, \ x_1 = 2 \)
   
   (b) \( f(x) = \cos x - x, \ x_1 = 1 \)
   
   (c) \( f(x) = e^x - (x + 2), \ x_1 = 1 \)

4. Given the derivative of the functions below, find the function \( f(x) \).
   
   (a) \( f'(x) = 2x. \ f(x) = \)
   
   (b) \( f'(x) = \sin x. \ f(x) = \)
   
   (c) \( f'(x) = e^x. \ f(x) = \)
   
   (d) \( f'(x) = \frac{1}{x}. \ f(x) = \)
   
   (e) \( f'(x) = \ln x. \ f(x) = \)
   
   (f) \( f'(x) = x \cos(x^2). \ f(x) = \)
   
   (g) \( f'(x) = x + 4. \ f(x) = \)