Calc 1 Review Problems

Biller

1) a: What is the derivative of \( f(x) = \frac{(x - 2)(x^2 + 4)}{(x - 2)} \) ?

b: What is the derivative at \( x=2 \)?

2) Find the equation of the tangent of the circle \( x^2 + y^2 = 5^2 \) at the point (3,4).

Blaski

1. For the following problem
   a) find all critical points on the specified interval:
   b) classify each critical point.
       is it a local maximum or minimum?
       is it a global maximum or minimum?

   \[ f(x) = 3x^4 - 8x^3 + 3 \text{ on } [-1, 1] \]

2. Find the derivative of the following function:

   \[ y = x \ln x \]

Fuentes

1. Evaluate the following limit.

   \[ \lim_{x \to \infty} \frac{5x + e^{-x}}{7x} \]

2. Given \( f(y) = \sqrt{1 + \ln(1 - y)} \), find the derivative.

Juarez

\[ \lim_{h \to 0} \frac{(3 + h)^3 - 27}{h} \]

Determine whether the following functions are invertible:

(a) \( f(x) = x^2 \)
(b) \( g(x) = \sin(x) \)
(c) \( h(x) = x^3 \)

Piazza

1. Problem 1: \( f(x) = \frac{1}{3}x^3 + \frac{5}{3}x + 2 \)

   1) Determine whether or not \( f(x) \) has an inverse function.

   2) Discuss whether the function is increasing or decreasing.

   3) Find any critical points if they exist. If none exist explain why.

2. Problem 2: Find the derivative of \( \tan^2(2x + 1) \).
Salazar
Find the equation of the tangent line to the parabola \( f(x) = x^2 + 2x + 3 \), at the point \( x = 3 \).
Differentiate the following: \( x^2 \sin x \), with respect to \( x \).

Smith
1. Find the equation of the tangent line to:

\[
y = x^2 + 1
\]
at the point \( x = 1 \)
2. You have 50 feet of fencing with which to enclose a rectangular space for a garden. Find the largest area that can be enclosed with this much fencing and the dimensions for the corresponding garden.

Youn
1. After birth, an infant normally will lose weight for a few days and then start gaining. A model for the average weight \( W \) (in pounds) of infants over the first 2 weeks following birth is \( W = .033t^2 - .3974t + 7.3032 \). \( 0 \leq t \leq 14 \) where \( t \) is measured in days. Find the open intervals on which \( W \) is increasing or decreasing.
2. Calculate three iterations of Newton’s Method to approximate a zero of \( f(x) = x^2 - 2 \). Use \( x_1 = 1 \) as the initial guess.