

Math 101 - Homework 9

Due Friday November 1

1. By replacing the left hand side of the equation $e^x + x = 2$ by its linearization near $x = 0$, find an approximate value for its solution. (3.9 #18)
 - See Example 2 on p179.
 - Further practice: 3.9 #3, 5, 11, 19.
 - Build-up: 3.9 #2, 7.
2. (a) Given that $f(7) = 13$ and $f'(7) = -0.38$, estimate $f(7.1)$. (3.9 #20)
(b) Suppose also $f''(x) < 0$ for all x . Does this make your answer to part (a) an under- or overestimate?
 - See Example 2 on p179.
 - Further practice: 3.9 #11, 12, 13, 21.
3. Dominic drove from Phoenix to Tucson on Interstate 10, a distance of 116 miles. The speed limit on this highway varies between 55mph and 75mph. He started his trip at 11:44pm and arrive in Tucson at 1:12am. Prove the Dominic was speeding at some point during his trip. (3.10 #18)
 - See Theorem 3.7 on p186.
 - Further practice: 3.10 #10, 11, 12.
4. Prove that if $f'(x) = g'(x)$ for all x in (a, b) , then there is a constant C such that $f(x) = g(x) + C$ for all x in (a, b) . (Hint: Apply the Constant Function Theorem to $h(x) = f(x) - g(x)$.) (3.10 #26)
 - See Theorem 3.9 on p187.
 - Further practice: 3.10 #19, 21, 22.