

Instructions: Please work the following problems on other pieces of paper. You must show all work and calculations in order to receive full credit. I would prefer to collect your assignments in class on the day it is due, but I will accept it as late as 5:00 PM on the due date. Assignments submitted later will receive 50% credit. (Note: There are problems on the back, so don't forget to flip the page over.)

1. Section 2.7 # 6.

2. Let $f(x) = \frac{2x - 3}{(2x - 3)(x + 2)}$. Determine where $f(x)$ is discontinuous. At each point of discontinuity, determine what kind of discontinuity it is (asymptote, jump, or removable).

3. Suppose $f(x) = \frac{x + 5}{x^2 + 3x - 10}$ whenever $x \neq -5$, and $f(x) = -\frac{1}{7}$ when $x = -5$. Is $f(x)$ continuous at $x = -5$? Use the definition of continuity to verify your result.

4. Section 2.7 # 38.

5. Let $g(x) = 3x^{5/9}$.

(a) Determine the domain of g .

(b) Determine the derivative of g .

(c) Is g continuous at $x = 0$?

(d) Are there any x -values in the domain of g that makes the derivative undefined?

(e) For the x -values where the derivative is undefined, does the graph of the function have a sharp turn or a vertical tangent or is it discontinuous?

6. Section 3.1 # 22.

7. Section 3.1 # 30.

8. (Similar to section project) Suppose the average salary of major league baseball players is modeled by

$$f(x) = 0.3x^4 - 9x^3 + 100x^2 - 300x + 600 \quad 1 \leq x \leq 14$$

where x represents the number of years since 1984 and $f(x)$ represents the average salary of major league baseball players in thousands of dollars.

- (a) Determine an equation for the tangent line at $x = 7$.
 - (b) Find the y -value of the tangent line when $x = 8$, and interpret.
 - (c) Find the y -value of the tangent line when $x = 14$, and interpret.
 - (d) Compute $f(14)$, the exact average salary of major league baseball players in thousands of dollars during 1998, and compare your answer to part (c). Explain the shortcomings of using the tangent line to make long-term predictions.
9. Section 3.2 # 6.
10. Section 3.2 # 10.
11. Section 3.2 # 14.
12. Section 3.2 # 22.