

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) pages, including this one.
- For multiple-choice questions, circle the answer you select. On the other problems, you should enter your answer in the box(es) provided.
- Show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given at the right of each problem number.
- No books or notes may be used on this test. Calculators are allowed, provided they don't have a computer algebra system.

Page	Max	Points
2	30	
3	30	
4	20	
5	20	
Total	100	

Problem 1 (10 pts). Find the derivative of the function $f(x) = (5x^4 + 1)^5$.

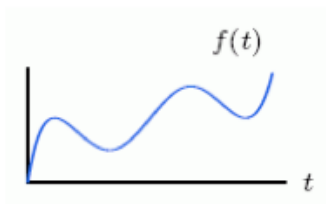
Problem 2 (10 pts). Find the derivative of the function $y = \ln(5t + 4)$.

Problem 3 (10 pts). Find the derivative of the function $f(x) = 8xe^x$.

Problem 4 (10 pts). Find the derivative of the function $z = (3t + 5)(9t + 7)$.

Problem 5 (10 pts). Find the derivative of $z = \frac{9 - t}{9 + t}$,

Problem 6 (10 pts). How many critical points and inflection points are there is the function below?



Problem 7 (10 pts). Use the first derivative for find all critical points and use the second derivative to find all inflection points.

$$f(x) = x^2 - 5x + 6.$$

Problem 8 (10 pts). The marginal revenue and marginal cost of a company are $MR(q) = 30$ and $MC(q) = 0.03q^2 - 1.5q + 36$ respectively, where q is the number of items manufactured. To increase profits, should the company increase or decrease production from each of the following levels?

(a) 25 items: The company should production.

(b) 50 items: The company should production.

(c) 80 items: The company should production.

Problem 9 (10 pts). Find the integral $\int \frac{6x^5}{x^6 + 1} dx$

Problem 10 (10 pts). Find the integral $\int x^5(x^6 + 4)^2 dx$.