

CALCULUS I/MATH 150

SHANNON MYERS

EXAM 2/PART 1

- π 60 POINTS POSSIBLE
- π YOUR WORK MUST SUPPORT YOUR ANSWER FOR FULL CREDIT TO BE AWARDED
- π YOU MAY USE A TI-83/84/85/86 GRAPHING CALCULATOR
- π PROVIDE EXACT ANSWERS (NO DECIMALS PLEASE) UNLESS OTHERWISE INDICATED
- π PLEASE MAKE SURE YOU ARE TAKING THE CORRECT EXAM!



ONCE YOU BEGIN THE EXAM, YOU MAY NOT LEAVE THE PROCTORING CENTER UNTIL YOU ARE FINISHED...THIS MEANS NO BATHROOM BREAKS!

NAME _____

EXAM 2/PART 1/CHAPTER 2.2-2.6, 3.1-3.5/70 MINUTES ALLOWED

60 POINTS POSSIBLE/BOX YOUR FINAL ANSWER

TI-83/84/85/86 GRAPHING CALCULATOR PERMITTED

FULL CREDIT WILL BE AWARDED BASED UPON WORK SHOWN—YOUR WORK

MUST SUPPORT YOUR RESULTS

NO DECIMALS UNLESS OTHERWISE INDICATED

(24 POINTS) Problems 1-4. Find the derivative of the functions below with respect to the independent variable. Each item is worth 4 points. EXACT, FULLY SIMPLIFIED ANSWERS ONLY!!! This means a single rational expression which has NO COMPLEX FRACTIONS or negative powers.

1. $f(x) = (1 + 3x^{2/3})^{80}$

2. $y = x\sqrt{1+2x}$

3. $h(t) = \frac{t^2 + 5}{t^3}$

4. $f(\theta) = \frac{\sec^2 \theta - 1}{\sec \theta}$

5. (5 POINTS) Find $\frac{dy}{dx}$.
 $\sin(xy) = \sin(x - y)$

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6. (6 POINTS) Find y''' .
 $y = x^3 - \frac{5}{x}$

7. (10 POINTS, 2 POINTS EACH) Please circle True (T) or False (F).
- a. T F The Mean Value Theorem gives us information about the domain values of a graph where the average rate of change is equal to the instantaneous rate of change.
 - b. T F If the first derivative is always negative over its domain, the graph of the original function is always increasing.
 - c. T F Rolles Theorem can be applied to $f(x) = 1 - x^{2/3}$ on the interval $[-1, 1]$
 - d. T F The acceleration function can be found by differentiating the velocity function twice.
 - e. T F When you apply the Second Derivative Test and get a positive value, the graph has a relative maximum at that particular critical number.
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8. (6 POINTS) Find the equation of the line tangent to the graph of

$$f(x) = \frac{4x^2 - 1}{2x + 1} \text{ at } x = 2.$$

9. (4 POINTS) Use calculus to find the **absolute** extrema of the function

$$f(x) = (1 - \sqrt{x})^6 \text{ on the closed interval } [1, 9].$$

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10. (5 POINTS) Solve the word problem showing all steps.

A ladder 25 feet long is leaning against the wall of a house. The base of the ladder is pulled away from the wall at a rate of 2 feet per second. How fast is the top of the ladder moving down the wall when its base is 15 feet from the wall?