

Your Name

Your Signature

Student ID #

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Your TA's name

Your Quiz Section Label and Time

Problem	Points	Possible
1		10
2		13
3		13
4		14
Total		60

- Turn off and put away cell phones, graphing calculators, books, and notebooks.
- You may use one $8\frac{1}{2} \times 11$ sheet of handwritten notes and a non-graphing calculator. Do not share notes or calculators.
- In order to receive credit, you must **show your work and explain your reasoning**, and give exact answers. You do not need to simplify answers algebraically.
- Place a box around **YOUR FINAL ANSWER** to each question.
- If you need more room, use the backs of the pages and indicate to the grader where to find your work.
- Raise your hand if you have a question or need more paper.

Please do not open the test until everyone has a copy and the start of the test is announced.

1. (10 points) A parallelepiped in the first octant has edges \vec{OP} , \vec{OQ} , and \vec{OR} going from the origin $O(0, 0, 0)$ to the vertices $P(4, 0, 0)$, $Q(1, 3, 0)$, and $R(2, 1, 2)$.
 - (a) Find the volume of the parallelepiped.

- (b) Find the sine of the angle between the edges \vec{OQ} and \vec{OR} .

2. (13 points) Let $f(x) = xe^{3x}$.

(a) Find the Taylor Series based at $b = 2$ for $f(x)$.

(b) Find $f^{(20)}(0)$.

3. (13 points)(a) Find the Taylor Series based at $b = 0$ for

$$g(x) = \frac{1}{5-x} + \frac{x}{1+4x^2}.$$

- (b) Find the interval of convergence for this Taylor Series.

4. (14 points) Consider the function $f(x) = \sin \frac{x}{2}$.

(a) Find the third order Taylor polynomial $T_3(x)$ based at $b = \pi$ for $f(x)$.

(b) Use the Taylor inequality to find an upper bound on the error $|f(x) - T_3(x)|$ on the interval $[\pi/2, 3\pi/2]$.