

Math 126 D Autumn 2024 Midterm II

November 19, 2024

Name_____

Student Number_____

Instructions

- These exams will be scanned. **Please write your name and student number clearly.**
- There are 4 questions. The exam is out of 50 points.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting. No printed material allowed. **Hand in your notes with your exam.**
- You can only use a Ti-30x IIS calculator. Unless otherwise stated, you have to give exact answers to questions. ($\frac{2\ln 3}{\pi}$ and $1/3$ are exact, 0.699 and 0.333 are approximations for those numbers.)
- Show your work. If we cannot read or follow your work, we cannot grade it. **You may not get full credit for a right answer if your answer is not justified by your work.**

1. (10 points) Find the equation of the tangent plane to the surface

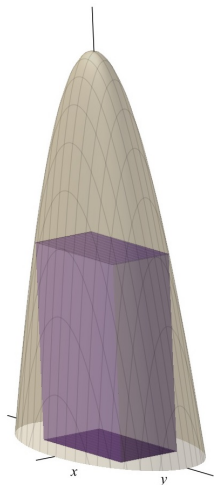
$$x^3 + y^3 = 3xyz$$

at the point $\left(1, 2, \frac{3}{2}\right)$ and use it to approximate the value of b if $(0.85, b, 1.44)$ is on this surface.

2. (15 points) Find the volume of the largest box sitting on the xy -plane which fits under the paraboloid

$$z = 9 - 4x^2 - y^2.$$

Make sure you justify that you have found a maximum using second derivatives.



3. (10 points) Evaluate the integral

$$\int_0^3 \int_{x^2}^9 \frac{x^3}{\sqrt{x^4 + y^2}} dy dx$$

NO LONGER COVERED IN MATH 126

Section 15.3 material - covered in Math 224

4. (15 points) Find the volume of the solid under the surface $z = 1 - x^2 - y^2$, over the xy -plane, and inside the cylinder $x^2 + y^2 - x = 0$.

NO LONGER COVERED IN MATH 126

Section 15.4 material - covered in Math 224

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