

Math 241, Exam 1, Spring, 2019

Write everything on the blank paper provided. **You should KEEP this piece of paper.** If possible: return the problems in order (use as much paper as necessary), use only one side of each piece of paper, and leave 1 square inch in the upper left hand corner for the staple. If you forget some of these requests, don't worry about it – I will still grade your exam.

The exam is worth 50 points. Each problem is worth 10 points. Please make your work coherent, complete, and correct. Please CIRCLE your answer. Please **CHECK** your answer whenever possible.

The solutions will be posted later today.

The exams will be returned on Thursday.

No Calculators, Cell phones, computers, notes, etc.

- (1) Find a system of parametric equations for the line through the points $P_1 = (6, 3, -1)$ and $P_2 = (1, -4, 1)$. **Check your answer. Make sure it is correct.**
- (2) Find an equation for the plane through the points $P_1 = (3, 4, 5)$, $P_2 = (4, 5, 6)$, and $P_3 = (2, 6, 8)$. **Check your answer. Make sure it is correct.**
- (3) Express $\vec{v} = 2\vec{i} + 3\vec{j}$ as the sum of a vector parallel to $\vec{b} = 3\vec{i} + 4\vec{j}$ and a vector orthogonal to \vec{b} . **Check your answer. Make sure it is correct.**
- (4) Parameterize the intersection of the two planes

$$3x + 6y + 2z = 3 \quad \text{and} \quad 2x + y + 2z = 2.$$

Check your answer. Make sure it is correct.

- (5) Do the lines

$$\begin{cases} x = s \\ y = -7 + 5s \\ z = 7 - 3s \end{cases} \quad \text{and} \quad \begin{cases} x = -3 - 2t \\ y = 6 + 4t \\ z = 2 - t \end{cases}$$

intersect? If so, where? If not, why not? **Check your answer. Make sure it is correct.**