

Math 241, Exam 1, Fall, 2017 1:15 class

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 Tuesday.

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

- (1) Find a system of parametric equations for the line through the points  $P_1 = (1, 2, -1)$  and  $P_2 = (-1, 0, 1)$ . **Check your answer. Make sure it is correct.**
- (2) Find an equation for the plane through the points  $P_1 = (2, 4, 5)$ ,  $P_2 = (1, 5, 7)$ , and  $P_3 = (-1, 6, 8)$ . **Check your answer. Make sure it is correct.**
- (3) Express  $\vec{v} = \vec{i} + 2\vec{j}$  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) Graph and describe the set of points in 3-space which satisfy  $y = 4$  and  $x^2 + y^2 + z^2 = 25$ .
- (5) Find the intersection of the line

$$\begin{cases} x = 2 \\ y = 3 + 2t \\ z = -2 - 2t \end{cases}$$

and the plane  $6x + 3y - 4z = -12$ .