

Math 241, Exam 2, Fall, 2017 11:40 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 Thursday.

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

- (1) Express $\vec{v} = 4\vec{i} + \vec{j}$ as the sum of a vector parallel to $\vec{b} = -2\vec{i} + 3\vec{j}$ plus a vector perpendicular to \vec{b} . **Check your answer. Make sure it is correct.**
- (2) Find the point on the line

$$x = 2 + 3t, \quad y = 3 - t, \quad z = 1 + 2t$$

which is nearest to the origin.

- (3) Graph and describe the set of points in 3-space which satisfy both of the equations

$$z = 4 \quad \text{and} \quad (x - 1)^2 + (y - 2)^2 + (z - 3)^2 = 16.$$

- (4) Let $f(x, y) = 3x^2 \sin(3y) + 7y \cos(2x)$. Find $\frac{\partial f}{\partial x}$.
- (5) An object is fired from the origin in the xy -plane at an angle α from the positive x -axis with an initial speed of v_0 . The acceleration of the object is $-g\vec{j}$. How high is the object when its x -coordinate is R ?