

Math 241, Exam 1, Spring, 2021

Write everything on the blank paper that you brought. There should be nothing on your desk except this exam, the blank paper that you brought, and a pen or pencil. When you are finished, send a picture of your solutions to

kustin@math.sc.edu

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.

- (1) Find an equation for the plane through the points $P_1 = (-2, 3, 4)$, $P_2 = (3, -4, 5)$, and $P_3 = (2, -1, -8)$. **Check your answer. Make sure it is correct.**
- (2) Express $\vec{v} = 2\vec{i} - 3\vec{j}$ as the sum of a vector parallel to $\vec{b} = 3\vec{i} + 5\vec{j}$ and a vector perpendicular to \vec{b} . **Check your answer. Make sure it is correct.**
- (3) Find parametric equations for the line which passes through the points $P = (1, 2, 3)$ and $Q = (3, 5, 7)$. **Check your answer. Make sure it is correct.**
- (4) Find the point on $x + 2y + 3z = 6$ which is closest to $(-1, 3, 2)$.
- (5) Write $2x^2 + 3y^2 - 8x + 12y + 15 = 0$ in the form $a(x - x_0)^2 + b(y - y_0)^2 = c$ for some numbers a, b, c, x_0 , and y_0 .