

Math 245 - Project # 1 - Exploring Lines with *Mathematica*

DUE: 11:59PM on Monday, September 29, 2025

Objective: To use *Mathematica* to generate three-dimensional plots of lines of various styles using the *ParametricPlot3D* command.

Question: Consider the line given below:

$$\frac{x-3}{2} = \frac{y+1}{4} = \frac{2-z}{3}.$$

- A) Find the equation of the line that is perpendicular to the above line and passes through both the given line *and* the point (1,1,1). Graph this new line on the same plot as the given line. The given line should be BLUE, thick, and solid while the second line that you find should be RED, thick, and dashed.
- B) Find the line that is parallel to the given line and also passes through (1,1,1). Now plot all three lines on the same graph, with this third line being GREEN, thick, and dotted.

NOTE: Be sure to include the work needed to deduce the equations of these new lines, as well as the rest of written expectations as laid out in the Projects section of the class website.