MATH 241 Calculus III Spring 2023 Groupwork 2: Section 11.4-11.6

You should work on and discuss this worksheet with members of your group. Your TA will assist as needed. Turn in your solutions either on this sheet or a separate sheet of paper. Be sure to include your name!

- 1. Of the following expressions, explain which are meaningful, and which are meaningless.
 - (a) $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$
 - (b) $\mathbf{a} \times (\mathbf{b} \cdot \mathbf{c})$
 - (c) $\mathbf{a} \times (\mathbf{b} \times \mathbf{c})$
 - (d) $(\mathbf{a} \cdot \mathbf{b}) \times (\mathbf{c} \cdot \mathbf{d})$
- 2. Find parametric and symmetric equations for the line passing through the points (6, 1, -3) and (2, 4, 5).
- 3. Is the line through the points (4, 1, -1) and (2, 5, 3) perpendicular to the line through the points (-3, 2, 0) and (5, 1, 4)?
- 4. Find the point at which the line x = 3 t, y = 2 + t, z = 5t intersects the plane x y + 2z = 9. Also find the angle the line makes with the plane (you may use a calculator).
- 5. Find the distance from the point (1, -2, 4) to the plane 3x + 2y + 6z = 5.
- 6. Consider the planes 2x 3y + 4z = 5 and x + 6y + 4z = 3. Determine if these planes are parallel, perpendicular, or neither. Explain.