

**Instructions:** (10 pts.) Show all work for credit. You may use your book, but no other resource.

1. (3 pts.) Find the equation of the plane that contains the three points

$$P(1, -1, 1), \quad Q(0, 4, -1), \quad R(-2, 0, 1)$$

*Answer:* \_\_\_\_\_

2. (2 pts.) Find the vector projection of the vector  $\mathbf{a} = \langle 2, -1 \rangle$  onto the vector  $\mathbf{b} = \langle 1, 3 \rangle$ .

*Answer:*  $\text{proj}_{\mathbf{b}} \mathbf{a} =$  \_\_\_\_\_

3. (5 pts.) Consider the two planes given by equations:

$$\text{Plane 1: } 3x + y + 2z = 5$$

$$\text{Plane 2: } 6x + y + 4z = 5$$

(a) (1 pts.) Prove that the two planes are not parallel.

(b) (3 pts.) Since the planes are skew, give the vector and parametric equations of the line of intersection between Plane 1 and Plane 2.

*Answer:* Vector equation: \_\_\_\_\_ Parametric Equations: \_\_\_\_\_

(c) (1 pt.) Prove that the line you found in part (b) is contained in Plane 1.