

1. (10 points)

a. Find a parametric representation of the line passing through the points  $(2, -1, 3)$  and  $(-1, 1, 1)$ .

b. Find an equation of the plane passing through the points  $(-1, 1, -2)$ ,  $(3, -1, 1)$  and  $(3, 2, 1)$ .

2. (10 points)

a. Determine if the given lines are parallel, skew, or intersect

$$l_1 : x = 2 + 2t, \quad y = 2t, \quad z = -1 + 4t$$

$$l_2 : x = 4 + s, \quad y = 2, \quad z = 3 + 2s.$$

b. Graph the surface  $z = \frac{x^2}{4} + \frac{y^2}{4}$ .