

Instructions: You need to show all your work. There will be no credits to answers without any explanation.

Problem 1. (4 points) Find a vector equation and a symmetric equation for the line passing through the points $(3, 4, -1)$ and $(1, 5, 2)$.

Problem 2. Let $P = (2, 0, 5)$, $Q = (3, 2, 5)$ and $R = (2, 3, 4)$.

(a) (2 points) Find \overrightarrow{PQ} and \overrightarrow{PR} .

(b) (2 points) Find a vector that is perpendicular to both \overrightarrow{PQ} and \overrightarrow{PR} .

(c) (2 points) Find an equation of the plane of the form $ax + by + cz = d$ that contains P , Q , and R .