

Name: _____ Section and/or TA: _____

1. (4 points) Consider the points $P(0, 2, 1)$, $Q(1, 5, 3)$, $R(3, 1, 1)$.(a) (3 points) Find an equation for the plane passing through P , Q and R . Write the equation in the form

$$x + by + cz = d.$$

Solution: We have

$$\overrightarrow{PQ} = \langle 1, 3, 2 \rangle, \quad \overrightarrow{PR} = \langle 3, -1, 0 \rangle$$

and

$$\overrightarrow{PQ} \times \overrightarrow{PR} = \langle 2, 6, -10 \rangle.$$

Thus the equation for the plane passing through P , Q and R can be written as

$$x + 3y - 5z = d.$$

To find d , substitute the coordinates of P (or Q , or R). This gives $d = 1$ and the equation of the plane is

$$x + 3y - 5z = 1.$$

(b) (1 point) Find an equation for the plane parallel to plane in part (a) and passing through $S(1, 1, 1)$.**Solution:** Since the planes are parallel, we can keep the same left-hand side. For the right-hand side, substitute the coordinates of S . This gives the equation

$$x + 3y - 5z = -1.$$