

Quiz 3

Name: _____ Section and/or TA: _____

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. (2 points) Find the equation of the *plane* through the point $(1, -1, 2)$ and with normal vector $3\mathbf{i} + 7\mathbf{j} - \mathbf{k}$.

Solution: From the normal vector we know that the equation of the plane is of the form

$$3x + 7y - z = d.$$

Plugging the given point in gives

$$d = 3(1) + 7(-1) - (2) = -6.$$

Hence the equation of the plane is

$$3x + 7y - z = -6.$$

2. (a) (2 points) Find the vector equation of the *line* through the point $(1, 2, 1)$ and perpendicular to the plane $2x - 2y - 3z = 2$.

Solution: The normal vector of the plane gives the direction of the line. It follows that the vector equation of the line is

$$\mathbf{r} = \langle 1, 2, 1 \rangle + t\langle 2, -2, -3 \rangle.$$

- (b) (1 point) Find the symmetric equations of the line from part (a).

Solution: Rearranging the information from above gives

$$\frac{x-1}{2} = \frac{y-2}{-2} = \frac{z-1}{-3}.$$