all correct!

Equations of Lines

For problems 1 & 2 give the equation of the line in vector form, parametric form and symmetric form.

1. The line through the points $(2,-4,1)$ and $(0,4,-10)$. $x = 2-2t,\ y = -4+8t,\ z = 1-11t$ (also write in parametric)

2. The line through the point $(-7,2,4)$ and parallel to the line given by $x = 5-8t,\ y = 6+t,\ z = -12t$. $x = -7-8t,\ y = 2+t,\ z = 4-12t$

3. Is the line through the points $(2,0,9)$ and $(-4,1,-5)$ parallel, orthogonal or neither to the line given by $\vec{r}(t) = \langle 5,1-9t,-8-4t\rangle$? neither

For problems 4 & 5 determine the intersection point of the two lines or show that they do not intersect.

4. The line given by $x = 8+t,\ y = 5+6t,\ z = 4-2t$ and the line given by $\vec{r}(t) = \langle -7+12t, 3-t, 14+8t\rangle$.

5. The line passing through the points $(1,-2,13)$ and $(2,0,-5)$ and the line given by $\vec{r}(t) = \langle 2+4t,-1-t,3\rangle$.

6. Does the line given by $x = 9+2t,\ y = -7,\ z = 12-11t$ intersect the xy-plane? If so, give the point. yes, $(35\frac{1}{11}, -7, 0)$

7. Does the line given by $x = 9+2t,\ y = -7,\ z = 12-11t$ intersect the xz-plane? If so, give the point. no - will not intersect

Equations of Planes

For problems 1 – 3 write down the equation of the plane.

1. The plane containing the points $(4,-3,1)$, $(-3,-1,1)$ and $(4,-2,8)$. $14x + 49y - 7z = -98$

2. The plane containing the point $(3,0,-4)$ and orthogonal to the line given by $\vec{r}(t) = \langle 12-t, 1+8t, 4+6t\rangle$. $-x + 8y + 6z + 27 = 0$

3. The plane containing the point $(-8,3,7)$ and parallel to the plane given by $4x+8y-2z = 45$. $4x + 8y - 2z = -22$

For problems 4 & 5 determine if the two planes are parallel, orthogonal or neither.

4. The plane given by $4x-9y-z = 3$ and the plane given by $x+2y-14z = -6$. orthogonal

5. The plane given by $-3x+2y+7z = 9$ and the plane containing the points $(-2,6,1)$, $(-2,5,0)$ and $(-1,4,-3)$. neither

For problems 6 & 7 determine where the line intersects the plane or show that it does not intersect the plane.

6. The line given by $\vec{r}(t) = \langle -2t, 2+7t, -1-4t\rangle$ and the plane given by $4x+9y-2z = -8$.

7. The line given by $\vec{r}(t) = \langle 4+t, -1+8t, 3+2t\rangle$ and the plane given by $2x-y+3z = 15$.

8. Find the line of intersection of the plane given by $3x+6y-5z = -3$ and the plane given by $-2x+7y-z = 24$. $x = -5+29t,\ y = 2+13t,\ z = 33t$

9. Determine if the line given by $x = 8-15t,\ y = 9t,\ z = 5+18t$ and the plane given by $10x-6y-12z = 7$ are parallel, orthogonal or neither.

the line & plane are orthogonal