MATH 2130 Tutorial 2

1. Find the equation of the plane that contains

$$2x + 3y + 4z = 6, \quad x - 2y + z = 3 \qquad \text{and} \qquad \frac{2x-1}{22} = \frac{y+2}{2} = \frac{1-z}{7}.$$

2. Find equations for the line perpendicular to the plane $x + 5y - 2z = 6$ and through the point of intersection of the lines

$$x = 2 + 3t, \quad y = 1 - t, \quad z = 4 + 2t; \qquad x = -1 + s, \quad 2 + 3s, \quad z = 2 + 2s.$$

3. Find equations for the line that is perpendicular to both the y-axis and the line $x - y = 2$, $3y + 4z = 6$, and intersects the z-axis at a point $\sqrt{11}$ units from the point $(1, -1, 2)$.

4. Find the equation of the plane that contains the points $(2, -1, 3)$ and $(1, 1, 4)$ and the line $2x - 3y + z = 3$, $x + 5y - z = 2$.

5. Find the distance from the point $(3, -1, 5)$ to the line $x = 2 + 3t$, $y = 2t - 1$, $z = 4 + t$.

6. Find the distance between the planes $x = 2y - 3z + 1$ and $3x - 6y + 9z = 4$.

7. Find the distance between the lines $y = 2x + 3z - 4$, $3x + y - 2z = 6$, and $x = 2 + t$, $y = 3 - 2t$, $z = 1 + t$.

8. Find equations for the planes that are 2 units apart, equidistant from the point $(1, -1, 2)$ and parallel to the plane $x + 2y - 5z = 6$.

Answers:

1. $24x - 13y + 34z = 72$

2. $x = -1 + u$, $y = 2 + 5u$, $z = 2 - 2u$

3. $x = 3t$, $y = 0$, $z = -1 + 4t$; or, $x = 3t$, $y = 0$, $z = 5 + 4t$

4. $23x + 11y + z = 38$

5. $\sqrt{6/7}$ **6.** $1/(3\sqrt{14})$ **7.** $1/\sqrt{14}$ **8.** $x + 2y - 5z = -11 \pm \sqrt{30}$