

## MATH 2130 Tutorial 2

1. Find the equation of the plane that contains

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

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

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

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.  $x + 2y - 5z = -11 \pm \sqrt{30}$