Unit 7: Sample Test Name:_____

1. Do the following equations describe lines **(L)** or planes **(P)**?
   a) $[x, y] = [1, 1] + s[2, 3]$ _____
   b) $[x, y, z] = t[1, 2, 3] + s[3, 4, -3]$ _____
   c) $4x - 5y + z = 7$ _____

2. List two points on each object.
   a) $\frac{x - 3}{1} = \frac{y + 7}{-2} = \frac{z - 5}{4}$ _____ _____
   b) $2x - 5y + z = 10$ _____ _____

3. What are the three possibilities for the intersection of a line and a plane? [2]

4. Determine the parametric equation of the line that passes through (2, -1, 3) and is perpendicular to the plane $x - 6y + 4z = 12$. [2]

5. Determine the scalar equation of the plane with x –intercept = 2, y-intercept = –1, and z -intercept = 3 [4]

6. Determine the distance from the point (2, -1, 5) to the plane $3x - 3y + 5z = 8$. [2]

7. If the following lines intersect, determine the point of intersection. Otherwise classify the lines. (i.e. describe the same line, are parallel and distinct, or skew) [5]

$[x,y,z] = [0,-8,4] + t[3,1,-1]$ and $\frac{x - 3}{1} = \frac{y + 7}{-2} = \frac{z - 5}{4}$

8. Determine the intersection of L_1: $\frac{x-3}{-3} = \frac{y-8}{5}$, $z = 4$ and π_1: $7x - 2y + z - 71 = 0$ [4]

9.a) Describe the nature of the system.
   b) Determine the intersection of the following 3 planes
$x + 2y + 3z + 4 = 0$
$x - y - 3z - 8 = 0$
$x + 5y + 9z + 16 = 0$ [6]

10. Determine the **vector equation of the plane** that contains the origin and the intersection of: $x + y + z = 5$
$3x + y - z = -7$

11. Toni has 24 coins (Quarters **x**, dimes **y**, nickels **z**) in her wallet. They are worth $3.80.
   a) Create two scalar equations in three unknowns to model this situation.
   b) Solve the system to determine the **algebraic solution**.
   (i.e. include meaningless values as well)
   c) Determine the actual (physical) solution in an efficient and meaningful way.
   (Trial and error will only receive 3)