7) Find the parametric and symmetric equations of the line through (-1, 2, 5) and (2, 4, 8).

direction vector $\langle 3, 2, 3 \rangle$

$$\left.\begin{aligned} x &= -1 + 3t \\ y &= 2 + 2t \\ z &= 5 + 3t \end{aligned}\right\} \text{ PARAMETRIC}$$

$$\left.\frac{x+1}{3} = \frac{y-2}{2} = \frac{z-5}{3}\right\} \text{ symmetric}$$

8) Find the equation of the plane through (4, 6, 2) that is perpendicular to the line $x = 2t, y = 3 + 5t, z = 6 - 3t$.

The plane is perpendicular to $\langle 2, 5, -3 \rangle$

$$2(x-4) + 5(y-6) + -3(z-2) = 0$$
$$2x - 8 + 5y - 30 - 3z + 6 = 0$$
$$\boxed{2x + 5y - 3z - 32 = 0}$$

9) Determine whether the following lines, L_1 and L_2, are parallel, skew, or intersecting. If they intersect, find the point of intersection.

L1: $x = 2 + 4t, y = -1 + t, z = 1 + 3t$

L2: $x = -3 - 3s, y = 1 - 4s, z = 1 - 8s$

NOT PARALLEL $\langle 4, 1, 3 \rangle \neq k\langle -3, -4, -8 \rangle$

$2 + 4t = -3 - 3s$
$-1 + t = 1 - 4s$ $\longrightarrow$ $3s + 4t = -5$
$4s + t = 2$ $(\times -4)$ $\longrightarrow$ $3s + 4t = -5$
$-16s - 4t = -8$
$-13s = -13$
$s = 1$
$t = -2$

does this work for z?

$1 + 3t = 1 - 8s$
$1 - 6 = 1 - 8$
$-5 = 0$

SKEW

10) Find the point at which the line intersects the given plane.

$x = 2 + t, y = 3 - t, z = 1 + 2t$ the plane $x + y + z = 5$

$$(2 + t) + (3 - t) + (1 + 2t) = 5$$
$$6 + 2t = 5$$
$$2t = -1$$
$$t = -\tfrac{1}{2}$$

point $x = 2 - \tfrac{1}{2}$
$y = 3 - -\tfrac{1}{2}$
$z = 1 + 2(-\tfrac{1}{2})$

$$\boxed{\left(\tfrac{3}{2}, \tfrac{7}{2}, 0\right)}$$