Thursday Practice 2 | **Name:** ______________________
MATH 241 (Spring 2023) | **Section:** 0112 (8AM-9AM) / 0122 (9:30AM-10:20AM)
02/09/2023 | **TA:** Shin Eui Song

Problem 1.

(a) Find a vector equation for the line given by

$$\frac{x+3}{2} = \frac{y-5}{7} = \frac{z-1}{-3}$$

(b) Find a parametric equation for the line given by

$$\vec{r} = (-2, 8, 13) + t(1, -3, 6)$$

(c) Find a symmetric equation for the line given by

$$x = 5t - 4, \qquad y = 10t + 1, \qquad z = 4t + 8$$

Problem 2. Let $\mathscr{P}$ be the plane given by $x + y - z - 3 = 0$. Determine whether the following planes are identical, parallel, perpendicular, or none of the above.

(a) $3x - y + 2z = 8$,

(b) $-3x - 3y + 3z + 9 = 0$,

(c) $2x + y - 3z - 1 = 0$,

(d) $\frac{1}{2}x + \frac{1}{2}y - \frac{1}{2}z = \frac{1}{3}$,

Problem 3. [§11.6, Problem 7] Find an equation of the plane that contains the point $(1, -1, 2)$ and the line with symmetric equations

$$x + 2 = y + 1 = \frac{z+5}{2}$$

※ The next two problems are challenge problems that are proof-focused.

Problem 4. [§11.6, Problem 16] Show that the distance D between the origin and the plane $ax+by+cz=d$ is $|d|/\sqrt{a^2+b^2+c^2}$.

Problem 5. [§11.5, Problem 29] Let $\vec{L}$ be a vector parallel to a given line ℓ. Show that if $\vec{a}$ and $\vec{b}$ have initial points at the origin and terminal points on ℓ, then $\vec{L}\times\vec{a}=\vec{L}\times\vec{b}$.