Homework 3

Problem 1. What is the angle between the two planes $x + z = 0$ and $2x + 2y + z = 0$?

Problem 2. Let P be the plane that contains the points $(2, 1, 3)$, $(2, 2, 4)$ and $(1, 1, 6)$. What is the distance from the point $(1, 1, 1)$ to the plane P?

Problem 3. Let L be the line through the origin that is perpendicular to the plane $2x + y + z = 7$. Find the distance between the point $(-4, 3, 5)$ and the line L

Problem 4. Find the equation of the plane that passes through $(1, 3, 2)$ and contains the line

$$\begin{aligned} x &= 1 + t \\ y &= -1 - 2t \\ z &= 3 + 2t \end{aligned}$$

What is the y-coordinate of the point where this plane intersects the y-axis?

Problem 5. Find $\mathbf{r}(t)$ if

$$\frac{d^2\mathbf{r}}{dt^2} = \langle -t^2, 1, -t \rangle, \tag{1}$$

$$\frac{d\mathbf{r}}{dt}(1) = \langle 2/3, 0, -1/2 \rangle, \tag{2}$$

$$\mathbf{r}(0) = \langle 1, -1, 0 \rangle, \tag{3}$$

What is the value of $\mathbf{r}(1)$?