Please show all work and **box your final answers**. If you need more room, you may use the backs of the pages. Calculators are not allowed. Good luck!

1. (8 points) Find parametric equations for the line *segment* from $(3, -2, 1)$ to $(-4, 0, -1)$.

2. (8 points) Sketch and describe the surface $z = 1 - y^2$.

3. (8 points) Find an equation for the plane that passes through the points $(0, -2, 5)$ and $(-1, 3, 1)$ and is perpendicular to the plane $2z = 5x + 4y$.

4. (8 points) Consider the space curve defined by the following vector-valued function.

$$\vec{r}(t) = \langle \sqrt{t^2 + 3}, \ \ln(t^2 + 3), \ t \rangle$$

Give a vector-valued function *and* parametric equations for the tangent line to the space curve $\vec{r}(t)$ at the point $(2, \ln 4, 1)$.

5. (4 points) State a single MatLab command that will assign to the variable x the vector

$$[7, 17, 27, \ldots, 107]$$

(a) using the **colon** :: operator;

(b) using the **linspace** command.

6. (4 points) If $x = [1, 2, 3, 4]$, what MatLab command will produce the output $[1^3, 2^3, 3^3, 4^3]$?