1. Find the equation of the plane through the point \((0, 2, 1)\) with normal vector \(\langle 2, 3, 2 \rangle\).

2. Find the equation of the plane through the points \((1, 2, 3), (2, -1, 2)\) and \((-1, -1, -1)\).
3. For the vector-valued function \( \vec{r}(t) = \langle 2e^t, t^3, \frac{1}{t} \rangle \), compute

(a) \( \vec{r}'(t) \)

(b) \( \int_1^3 \vec{r}(t) \, dt \)

4. Find the tangent vector to the curve \( \vec{r}(t) = \langle t^4, e^t + 2, 2t^2 + 3t + 1 \rangle \) at the point \( t = 2 \).
5. For the curve \( \vec{r}(t) = \langle \cos(4t), 3t, \sin(4t) \rangle \), compute

(a) the length of \( \vec{r}(t) \) between \( t = 0 \) and \( t = 3 \).

(b) the curvature of \( \vec{r}(t) \) at \( t = 1 \).
Possibly Helpful Formulas:
\[
\vec{v} \times \vec{w} = \langle a_2 b_3 - a_3 b_2, a_3 b_1 - a_1 b_3, a_1 b_2 - a_2 b_1 \rangle
\]

Equations for a Plane:
\[
\vec{n} \cdot \langle x, y, z \rangle = d
\]
\[
a(x - x_0) + b(y - y_0) + c(z - z_0) = 0
\]
\[
a x + b y + c z = d
\]

for \( \vec{n} = \langle a, b, c \rangle \) and \( d = ax_0 + by_0 + cz_0 \).

Arc Length (length of a curve) from \( a \) to \( t \):
\[
s(t) = \int_a^t ||\vec{r}(u)|| \, du
\]

Curvature formulas
\[
\kappa(t) = \left| \left| \frac{d\vec{T}}{ds} \right| \right|
\]
\[
\kappa(t) = \frac{||\vec{r}'(t) \times \vec{r}''(t)||}{||\vec{r}'(t)||^3}
\]