1. Find the equation of the line of intersection of the planes $2x + 5z + 3 = 0$ and $x - 3y + z + 2 = 0$. 

2. Find the tangent line to the parametric curve $x = e^{-t} \cos t$, $y = e^{-t} \sin t$, $z = e^{-t}$ at the point $(1, 0, 1)$. 

3. Find all the points at which the fastest change of the function $f(x, y) = x^2 + y^2 - 2x - 4y$ is in the direction of the vector $\mathbf{i} + \mathbf{j}$. 

4. Find the maxima, minima and saddle points of the function $f(x, y) = x^2 + y^2 + \frac{1}{x^2y^2}$. 

5. A box with no lid is to have a volume of $32 \, m^3$. Find the minimum amount of cardboard necessary to produce such a box.