Problems:

Prob. 1
Find the directional derivative of
\[ F(x, y, z) = 6x^2y - 3x^2y^2 + 4xz - z^4 \]
at \((-1, 2, -1)\) in the direction of \(-2i + 3j + 2k\)

Prob. 2
Evaluate \(\int_C 5y^3dx - 3xdy\) where \(C\) is given by

\[
\begin{align*}
  y &= 0, \quad 0 \leq x \leq 3 \\
  x &= 2, \quad 0 \leq y \leq 5 \\
  y &= 3x^2
\end{align*}
\]