1. If the tangent line to the parabola \( y = 2x^2 + 3x + 2 \) at the point \((a, b)\) is perpendicular to the line \( x + 11y = 0 \). Find the value(s) of \( a \) and \( b \).

2. Find the value(s) of \( a \) and \( b \) that makes the following function differentiable for all \( x \)-values

\[
f(x) = \begin{cases} 
  bx + a + 1 & x \leq 2 \\
  ax^2 + 2bx & x > 2 
\end{cases}
\]
3. \[ \lim_{x \to -1} \frac{x^{2/9} - 1}{x + 1} \]

4. If \( f(x) = |x + 1| + 3|x - 3| \), then find \( f'(-3) + f'(1) + f'(6) \)
5. The position function of a body moving in a straight line is

\[ s(t) = 2t^3 - 9t^2 + 12t, \quad t \geq 0 \]

When the body change direction?

6. Let \( y = \left( \frac{u - 3}{u + 3} \right)^2 \) and \( u = e^{3x} \cos x \). Find \( \frac{dy}{dx} \) when \( x = 0 \)