Q1- Let

\[ f(x) = \begin{cases} \frac{(x - 1)(x + 3)}{(x - 1)^n}, & x > 1 \\ x^2 + 3, & x \leq 1 \end{cases} \]

where \( n \) is a nonnegative integer, \( (n \geq 0) \)

Use limits to find the value(s) of \( n \) for which the function has infinite discontinuity at \( x = 1 \).

Q2. Using the \( \varepsilon - \delta \) definition, find the value of \( \delta \) such that \( \lim_{x \to -4} (1 - 3x) = 13 \)

Q3. Find real \( \alpha \) such that \( f(x) = \begin{cases} \alpha^4 - 2x^2 & if \ x \leq 1 \\ x - 2\alpha^2 & if \ x > 1 \end{cases} \) is continuous.
Q4. Use the limits to find all horizontal asymptotes to the curve of the function:

\[ f(x) = \sqrt{9x^2 + 2x} - \sqrt{9x^2 + 5x} \]

Q5. Solve the limit

\[ \lim_\limits{x \to \infty} \frac{\sqrt{9x^2} - 9}{2x - 6} \]