Q.No.1:- Let \( f(x) = \sqrt{1 + \sqrt{x}} \). Use the definition of derivative to find \( f'(x_0) \).

Final Answer (2 point): ________

Work Shown (5 points):
Q.No.2: Use the limits to find all horizontal asymptotes to the curve of the function:

\[ f(x) = \sqrt{4x^2 + 2x} - \sqrt{4x^2 + 5x} \]

Final Answer (2 point): 

Work Shown (4 points):
Q.No.3: 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, \( n \geq 0 \)

(a) Use limits to find the value(s) of \( n \) for which the function is continuous at every \( x \).

Final Answer (1 point): __________

Work Shown (5 points):
(b) Use limits to find the value(s) of \( n \) for which the function has infinite discontinuity at \( x = 1 \).

Final Answer (1 point): _________

Work Shown (5 points):