1. Use the Intermediate Value Theorem to prove that the equation \( \cos x = x \) has a solution.

2. Find \( \lim_{x \to 1} \frac{2x^3 + 1}{\sqrt{x^6 - 9x^4}} \)

3. Use limits to determine the equations for all asymptotes of \( f(x) = \frac{x^3 - 8}{x^2 - x - 2} \)
4. Find \( \lim_{\theta \to 0} \frac{\sqrt{2\theta + 3} - \sqrt{3}}{\sin \theta} \)

5. For what values of \( a \) and \( b \) is 

\[
f(x) = \begin{cases} 
  x + 2a & x < 0 \\
  ax^2 + b & 0 \leq x \leq 1 \\
  \frac{x-b}{bx+1} & x > 1 
\end{cases}
\]

6. Let \( f(x) = \frac{x^2 - 16}{x^2 - 3x - 4} \)

   (a) Find the points of discontinuity of \( f \).

   (b) Classify the points found in part (a) as removable, jump or infinite discontinuity. Justify your answer.