Show your work for credit.

Evaluate the following limits by using algebra.

1. $\lim\limits_{x \to 4} \dfrac{x^2+5x+4}{x^2+3x-4}$

2. $\lim\limits_{x \to 1} \dfrac{x^3-1}{x^2-1}$

3. $\lim\limits_{x \to 0} \dfrac{\sqrt{1+x}-1}{x}$

4. $\lim\limits_{x \to 5^+} \dfrac{|x-5|}{x-5}$

5. $\lim\limits_{x \to 0^-} \left(\dfrac{1}{x} - \dfrac{1}{|x|} \right)$

6. $\lim\limits_{x \to -4} \left(\dfrac{\frac{1}{4}+\frac{1}{x}}{4+x} \right)$

7. $\lim\limits_{x \to \pi/4} \tan(x)$

8. $\lim\limits_{x \to -\pi^+} \csc(x)$

9. If $1 \le f(x) \le x^2 + 2x + 2$ for all x, then determine $\lim\limits_{x \to -1} f(x)$

10. Determine whether the function is discontinuous or continuous at $x = 0, x = 1, x = 2$.

$$f(x) = \begin{cases} x+1 & for\ x \le 0 \\ x^2 - 1 & for\ 0 < x \le 2 \\ 5 - x & for\ x > 2 \end{cases}$$

11. Determine the intervals of continuity for the following functions.

$$f(x) = \cos(x) + \sqrt{x^2 - 4}$$

12. Determine the intervals of continuity for the following functions.

$$f(x) = \frac{\sqrt{x}}{x^2 - 9}$$

13. Show there is a root in the following interval $(0,1)$ for $f(x) = \sqrt[3]{x} + x - 1$