Department of Mathematical Sciences
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$\epsilon - \delta$ Proof for Quadratic

$$\lim_{x \to 2} x^2 + 2x - 7 = 1.$$

$$\begin{array}{rcccl}
 & & |(x^2+2x-7)-1| & < & \epsilon. \\
 & & |x^2+2x-8| & < & \epsilon. \\
-\epsilon & < & x^2+2x-8 & < & \epsilon. \\
-\epsilon & < & x^2+2x+1-1-8 & < & \epsilon. \\
-\epsilon & < & (x+1)^2-9 & < & \epsilon. \\
-\epsilon+9 & < & (x+1)^2 & < & \epsilon+9. \\
\sqrt{-\epsilon+9} & < & x+1 & < & \sqrt{\epsilon+9}. \\
\sqrt{-\epsilon+9}-3 & < & x-2 & < & \sqrt{\epsilon+9}-3. \\
 & & \delta & = & \sqrt{\epsilon+9}-3.
\end{array}$$