Directions: Please answer the following questions and make sure your answer are legible. You must show your work to receive credit for your answers. You may not use a calculator (or any other technology) on this quiz. Good Luck.

1. (4 points) Factor the following polynomials:
   
   (a) $36x^2 - 9$  
   (b) $3x^2 + 10x + 8$  

   a) $(6x + 3)(6x - 3)$ [Diff of 2 squares]  
   b) $3x^2 + 10x + 8 = (3x + 4)(x + 2)$  

2. (4 points) Simplify $\frac{3}{(x-1)^2(x+1)} + \frac{2}{(x-1)(x+1)}$. Leave your answer in factored form.  

   $\frac{3}{(x-1)^2(x+1)} + \frac{2}{(x-1)^2(x+1)} = \frac{3 + 2x - 2}{(x-1)^2(x+1)} = \frac{2x + 1}{(x-1)^2(x+1)}$  

3. (4 points) Simplify $\frac{1 - \frac{x}{x+1}}{2 - \frac{x}{x-1}}$.  

   $\frac{x+1}{x+1} - \frac{x}{x+1} = \frac{1}{x+1} - \frac{x}{x+1} = \frac{1}{x+1} - \frac{x}{x+1} = \frac{x}{(x+1)^2}$
4. (4 points) Rationalize the denominator for \( \frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} + \sqrt{x}} \) (#53 in R8)

\[
\begin{align*}
\frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} + \sqrt{x}} & \left( \frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} - \sqrt{x}} \right) \\
& = \frac{(\sqrt{x+h})^2 - 2\sqrt{x}\sqrt{x+h} + (\sqrt{x})^2}{(\sqrt{x+h})^2 - (\sqrt{x})^2} \\
& = \frac{(x+h) - 2\sqrt{x}\sqrt{x+h} + x}{(x+h) - x} \\
& = \frac{2x + h - 2\sqrt{x^2 + xh}}{h} \\
& \text{or} \frac{2x + h - 2\sqrt{x^2 + xh}}{h}
\end{align*}
\]

5. (4 points) Find all solutions of the equation \( \frac{-4}{2x+3} + \frac{1}{x-1} = \frac{1}{(2x+3)(x-1)} \) (#60 in 1.1)

\[
\begin{align*}
\frac{-4}{(2x+3)(x-1)} + 1 \frac{(2x+3)}{(x-1)(2x+3)} & = \frac{1}{(2x+3)(x-1)} \\
\frac{-4 \cdot x + 4 + 2x + 3}{(2x+3)(x-1)} & = \frac{1}{(2x+3)(x-1)} \\
-2x + 7 & = 1 \\
-2x & = -6 \\
x & = 3
\end{align*}
\]

\{+3\}