There are 5 problems on this homework. Complete all problems, showing all work. There are ten points available. Five points will be awarded if every question is attempted and two questions will be graded for the remaining 5 points. Answers given without explanation or justification are not counted as attempted questions. The homework is due at the beginning of the recitation on Thursday Sep. 16.

1. Complete the square for the following two expressions:
   (a) $f(x) = 3x^2 - 7x + 1$
   (b) $g(x) = \pi x^2 + 2x$

2. Solve the following equations for $x$:
   (a) $\frac{1}{2}x^2 + yx - y^2 = 0$
   (b) $\frac{1}{x+1} + \frac{1}{x} = \frac{3}{x^2+x}$

3. Factor $x^4 - x^3 + 5x^2 + x - 6$ by finding the roots and using long division. (Hint: try out easy if the polynomial is 0 for easy values)

4. Simplify (a) $\frac{x^4 + 2x + 1}{x^2 - 1}$ (b) $x + \frac{1}{x} + \frac{1}{x+\frac{1}{x}}$

5. Rationalize the denominator:
   (a) $\frac{x^4 - 36}{x - \sqrt{6}}$ (b) $\frac{2x - 6x^2}{\sqrt{4x^2 + 8x^2} - 2x}$