P5 - Rational Expressions

Review problems

1. Factoring polynomials. Factor the following polynomials completely:
   (a) \( x^4 - 64 \)  
   (b) \( 2x^3 - 12x^2 + 8x \)  
   (c) \( x^2 + 10x + 25 \)  
   (d) \( x^4 + 25x^2 \)

2. Operations on fractions. Evaluate and simplify:
   (a) \( \frac{2}{9} \cdot \frac{12}{5} \)  
   (b) \( \frac{6}{25} + \frac{12}{20} \)  
   (c) \( \frac{1 + \frac{1}{3}}{3 - \frac{3}{4}} \)

Basic knowledge

3. Perform indicated operations and simplify the results. Write answers in factored form.
   (a) \( \frac{x^2 - 10x + 24}{x^2 - 2x - 8} \cdot \frac{x^2 - 4}{x^2 - 36} \)  
   (b) \( \frac{3x}{x^2 - 9} - \frac{4}{x + 3} \)  
   (c) \( \frac{x^2}{7x^3 + 28x^2} + \frac{3x^2 + 3x}{x^2 - 16} \)  
   (d) \( \frac{2}{x} - \frac{3}{x + 1} \)  
   (e) \( \frac{2x}{x^2 - 5x} + \frac{x + 1}{x^2 + 2x} \)

Intermediate/Advanced Knowledge

4. Perform indicated operations and simplify the results. Write answers in factored form.
   (a) \( \frac{x - 2}{x^2 + 4x + 4} - \frac{1}{4 - x^2} - \frac{2}{x^2 + 2x} \)  
   (b) \( \frac{1}{x} + \frac{x}{x + 1} \)  
   (c) \( \frac{1}{(x+h)^2} - \frac{1}{x^2} \)