

## 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)  $2 - \frac{5}{9} \cdot \frac{12}{5}$       (b)  $\frac{6}{25} \div \frac{12}{20}$       (c)  $\frac{1 + \frac{1}{2}}{3 - \frac{3}{4}}$

### 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)  $\frac{x^2}{7x^3 + 28x^2} \div \frac{3x^2 + 3x}{x^2 - 16}$

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

(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)  $\frac{1}{x} + \frac{x}{x + \frac{1}{x+1}}$

(c)  $\frac{\frac{1}{(x+h)^2} - \frac{1}{x^2}}{h}$