

1. Perform the operations indicated and then reduce to lowest terms.

$$(a) \frac{x^2 + 4x - 21}{x^2 - 12x + 27} \cdot \frac{x^2 - 7x + 12}{x^2 + 3x - 28}$$

$$(e) \frac{\frac{1}{x} + \frac{2}{y}}{\frac{2}{x} + \frac{1}{y}}$$

$$(b) \frac{x^2 - 2x + 1}{3x^2 + 7x - 20} \div \frac{x^2 + 3x - 4}{3x^2 - 2x - 5}$$

$$(f) \frac{3 + \frac{5}{x} - \frac{12}{x^2} - \frac{20}{x^3}}{3 + \frac{11}{x} + \frac{10}{x^2}}$$

$$(c) \frac{x + 7}{2x + 12} + \frac{6}{x^2 - 36}$$

$$(g) \frac{(x^2 - 5)^4(3x^2) - x^3(4)(x^2 - 5)^3(2x)}{[(x^2 - 5)^4]^2}$$

$$(d) \frac{3x}{x^2 + 7x + 10} - \frac{2x}{x^2 + 6x + 8}$$

2. Rationalize the denominator in the following expressions and then simplify the result:

(a)  $\frac{\sqrt{x} - 1}{1 + \sqrt{x}}$

(b)  $\frac{x^2 - y^2}{\sqrt{x} - \sqrt{y}}$