For all of these, do the addition/subtraction, and then simplify the numerator (top), but leave the denominator factored. You don’t have to look for common factors to cancel. Your answers will look like (1) \[ \frac{x^2 + 2x - 4}{(x + 2)(x - 7)(x - 1)}. \]

Note that when adding or subtracting fractions, you must have a common denominator!!

1. \[ \frac{1}{x^2 - 1} - \frac{3x}{x^2 + x - 2} \]
2. \[ \frac{1}{x + 1} + \frac{1}{x - 1} \]
3. \[ \frac{x - 3}{x^2 + x - 2} + \frac{x + 2}{x^2 + 5x + 6} \]
4. \[ \frac{x - 2}{x^2 - x - 6} + \frac{x^2 + 2x - 1}{x^2 + 3x + 2} \]
5. \[ \frac{x - 2}{x^2 - 2x - 3} + \frac{3}{x^2 - x - 2} \]

Answers:

1) \[ \frac{-3x^2 - 2x + 2}{(x+1)(x-1)(x+2)}, \quad \text{2)} \frac{2x}{(x+1)(x-1)}, \quad \text{3)} \frac{2x^2 + x - 11}{(x+2)(x-1)(x+3)} \]
4) \[ \frac{x^2 - 8x + 1}{(x+2)(x-3)(x+1)}, \quad \text{5)} \frac{x^2 - x - 5}{(x+1)(x-3)(x-2)} \]