Solve the following rational equations by hand.

1. $\frac{4}{x-1} = \frac{x+1}{12}$ 2. $\frac{x}{x+3} = \frac{3}{19}$ 3. $\frac{24}{r-3} = \frac{36}{r+3}$ 4. $\frac{10}{r^2-4} - \frac{3}{r-2} = \frac{6}{r+2}$ 5. $\frac{1}{b^2-7b+10} + \frac{1}{b-2} = \frac{2}{b^2-7b+10}$

Solve the following rational inequalities by hand.

6. $\frac{4}{x} > 3$ 7. $\frac{x+2}{x-1} < 4$ 8. $\frac{x^2+3x+2}{x+4} \leq 0$ 9. $\frac{1}{x} + \frac{3}{4} \geq \frac{1}{2}$ 10. $\frac{3}{x+2} + \frac{1}{x^2-x-6} \geq \frac{2}{x-3}$

Simplify

11. $\frac{2b+6}{b+3}$ 12 $\frac{x^2+17x+70}{x^2+16x+63}$ 13. $\frac{2x^2+13x+6}{5x^3+25x^2-30x}$ 14. $\frac{6x^2+30x}{7} \cdot \frac{7}{x+5}$ 15. $\frac{9m-45}{7m+4} \cdot \frac{35m^2+20m}{5m^2-25m}$

16. $\frac{x+2}{x^2+2x-80} \div \frac{1}{x+10}$ 17. $\frac{7n+1}{42n+6} \div \frac{15n+15}{50n+50}$ 18. $\frac{2x}{2} + \frac{5}{2x+8}$ 19. $\frac{6a}{a-3} - \frac{7}{a-2}$