

# Review of Adding Rational Expressions

(9)  $\frac{5}{3n} + \frac{n-4}{3n^2-9n}$  CD:  $\frac{3n}{3n} \cdot \frac{(n-3)}{(n-3)}$

$$\frac{5(n-3)}{3n(n-3)} + \frac{n-4}{3n(n-3)}$$

$$\frac{5n-15+n-4}{3n(n-3)} = \frac{6n-19}{3n(n-3)}$$

(12) CD:  $\frac{r^2+3r-18}{4}$

$$\frac{2}{r^2+3r-18} + \frac{2r}{4(r^2+3r-18)}$$

$$\frac{8 + 2r^3 + 6r^2 - 36r}{4(r^2+3r-18)}$$

$$= \frac{2(4+r^3+3r^2-18r)}{2(r^2+3r-18)}$$

$$\frac{(r^3+3r^2-18r+4)}{2(r^2+3r-18)}$$

(3)  $\frac{n+3}{2n-8} + \frac{n-1}{3n}$  CD:  $\frac{2(n-4)}{3n}$

$$\frac{n+3}{2(n-4)} + \frac{(n-1)(2n-8)}{3n(2(n-4))}$$

FOIL  
 $2n^2 - 8n - 2n + 8$   
 $2n^2 - 10n + 8$

$$\frac{3n^2+9n}{2(n-4)(3n)} + \frac{2n^2-10n+8}{2(n-4)(3n)}$$

$$\frac{5n^2-n+8}{2(n-4)(3n)} \quad ac=40 \quad b=-1$$

# Subtracting Rational Expressions

Steps for Subtracting Rational Expressions

$$\frac{6}{3x} - \frac{4}{15x+18}$$

- Simplify rational expressions if possible.  $\frac{2}{x} - \frac{4}{15x+18}$
- Put parentheses around the numerators of both rational expressions.  $\frac{(2)}{x} - \frac{(4)}{15x+18}$
- Make sure the two expressions have like denominators; if not, multiply each so that they have like denominators.  $\frac{3(5x+6)(2)}{3(5x+6)x} - \frac{(4)(x)}{3(5x+6)x}$
- Subtract the numerators (make sure to distribute the negative) but leave the denominator as it is.  $\frac{(30x+36)-(4x)}{x(3(5x+6))}$   
 $\frac{26x+36}{x(3(5x+6))}$
- Simplify.  $\frac{2(13x+18)}{x(3(5x+6))}$

$$\begin{aligned}
 & \frac{(3x^2+9x)4}{(3x^2+9x)3x} - \frac{4}{3x^2+9x} \frac{(3x)}{(3x)} \\
 & = \frac{(12x^2+36x)-(12x)}{(3x)(3x^2+9x)} \\
 & = \frac{12x^2+24x}{(3x)(3x^2+9x)} \\
 & = \frac{4 \cancel{3x}(x+2)}{\cancel{3x}(3x^2+9x)} \\
 & = \frac{4(x+2)}{3x^2+9x} \\
 & = \frac{4(x+2)}{3x(x+3)}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{(n-6)6n}{(n-6)n+6} - \frac{3n}{n-6} \frac{(n+6)}{(n+6)} \\
 & = \frac{(6n^2-36n)-1(3n^2+18n)}{(n+6)(n-6)} \\
 & = \frac{6n^2-36n-3n^2-18n}{(n+6)(n-6)} \\
 & = \frac{3n^2-54n}{(n+6)(n-6)} \\
 & = \frac{3n(n-18)}{(n+6)(n-6)}
 \end{aligned}$$