

Common Denominators

$$\frac{1}{8} + \frac{5}{8} \xrightarrow{\text{SAME}} \frac{6}{8} \xrightarrow{\text{REDUCE}} \frac{3}{4}$$

$$\frac{2x+1}{x^2-9} + \frac{5}{x^2-9} \xrightarrow{\text{SAME}} \frac{2x+6}{x^2-9} \xrightarrow{\text{REDUCE}} \frac{2(x+3)}{(x+3)(x-3)} \xrightarrow{\text{DOTS}} \frac{2}{x-3}$$

Unlike Denominators

BRUTE FORCE

$$\frac{12}{12} \cdot \frac{1}{8} + \frac{5}{12} \cdot \frac{8}{8} \rightarrow \frac{12}{96} + \frac{40}{96} \xrightarrow{\text{SAME}} \frac{52}{96} \xrightarrow{\text{REDUCE}} \frac{13}{24}$$

denominator of 2nd fraction do not match denominator of 1st fraction match

LEAST COMMON DENOMINATOR (LCD)

$$\frac{3}{3} \cdot \frac{1}{8} + \frac{5}{12} \cdot \frac{2}{2} \rightarrow \frac{3}{24} + \frac{10}{24} \xrightarrow{\text{SAME}} \frac{13}{24}$$

do not match match

BRUTE FORCE

$$\frac{4x-12}{4x-12} \cdot \frac{x}{x^2-9} + \frac{5}{4x-12} \cdot \frac{x^2-9}{x^2-9} \xrightarrow{\text{DO NOT MULTIPLY}} \frac{4x^2-12x}{(4x-12)(x^2-9)} + \frac{5x^2-45}{(4x-12)(x^2-9)} \xrightarrow{\text{SAME}} \frac{9x^2-12x-45}{(4x-12)(x^2-9)} \xrightarrow{\text{REDUCE}} \frac{3(3x+5)}{4(x-3)(x+3)} \rightarrow \frac{3(3x+5)}{4(x-3)(x+3)}$$

denominator of 2nd fraction do not match denominator of 1st fraction match

GCF 3(3x(x-3)+5(x-3))
3(3x^2-9x+5x-15)
-9x-15
GCF 3(3x^2-4x-15)

GCF 4(x-3)(x+3)(x-3) DOTS

LEAST COMMON DENOMINATOR (LCD)

Steps:

- ① Factor both numerators and denominators
- ② Identify any common factors in denominators and any uncommon factors in denominators
- ③ Multiply both fractions by any uncommon factors so that the denominators will match
- * Fully simplify numerators
Do NOT simplify denominators
- ④ Combine like terms by addition or subtraction
- ⑤ Try to reduce (Factor/Cancel)

ex

$$\frac{x}{x^2-9} + \frac{5}{4x-12}$$

- ① $\frac{x}{(x+3)(x-3)} + \frac{5}{4(x-3)}$ GCF
- ② $\frac{x}{(x+3)(x-3)} + \frac{5}{4(x-3)}$ match
- ③ $\frac{4}{4} \cdot \frac{x}{(x+3)(x-3)} + \frac{5}{4} \cdot \frac{(x+3)}{(x-3)(x+3)}$
- $\frac{4x}{4(x+3)(x-3)} + \frac{5x+15}{4(x-3)(x+3)}$ match
- ④ $\frac{9x+15}{4(x+3)(x-3)}$
- ⑤ GCF $\frac{3(3x+5)}{4(x+3)(x-3)}$

