Name Solutions FA Addition and Subtraction of Rational Expressions 2 Period ___

COMPLETELY simplify each expression SHOW YOUR WORK IN A CLEAR AND EASY TO FOLLOW MANNER

NO NEED TO EXPAND FACTORED DENOMINATOR!

$$\frac{x+6}{x^2-36}+\frac{4x-10}{x^2+3x-18}$$

$$\frac{x+6}{(x-6)(x+6)}+\frac{4x-10}{(x+6)(x-3)}$$

GCF $(x+6)$

$$\boxed{\frac{5x^2-31x+42}{(x+6)(x-6)(x-3)}}$$ answer

$$\boxed{\frac{(5x-21)(x-2)}{(x+6)(x-6)(x-3)}}$$

LCD $(x+6)(x-6)(x-3)$

$$\frac{3x+5}{x^2-x-30}-\frac{x-4}{x^2-7x+6}$$

$$\frac{3x+5}{(x-6)(x+5)}+\frac{-x+4}{(x-1)(x-6)}$$

GCF $(x-6)$

$$\boxed{\frac{2x^2+1x+15}{(x-6)(x+5)(x-1)}}$$ answer

LCD $(x-6)(x+5)(x-1)$

$5(6)^2-31(6)+42=36\neq 0$

$(x-6)$ not factor

$5(-6)^2-31(-6)+42=408\neq 0$

$(x+6)$ not factor

$5(3)^2-31(3)+42=-6\neq 0$

$(x-3)$ not factor

$2(1)^2+1(1)+15=18\neq 0$

$(x-1)$ not a factor

$2(6)^2+1(6)+15=93\neq 0$

$(x-6)$ not a factor

$2(-5)^2+1(-5)+15=60\neq 0$

$(x+5)$ not factor

COMPLETELY simplify each expression SHOW YOUR WORK IN A CLEAR AND EASY TO FOLLOW MANNER

NO NEED TO EXPAND FACTORED DENOMINATOR!

$$\frac{x+9}{x^2+5x-6}+\frac{5x-7}{x^2+12x+36}$$

$$\frac{x+9}{\underline{(x+6)}(x-1)}+\frac{5x-7}{\underline{(x+6)}(x+6)}$$

GCF $(x+6)$

LCD $\underline{(x+6)}(x+6)(x-1)$

ANSWER $\boxed{\dfrac{6x^2+3x+61}{(x+6)(x+6)(x-1)}}$

Factor Test

$6(1)^2+3(1)+61=70\neq 0$

$(x-1)$ not a factor of numerator

$6(-6)^2+3(-6)+61=259\neq 0$

$(x+6)$ not a factor of numerator

Factor Check

$$\begin{array}{r|rrr} 1 & 6 & 3 & 61 \\ & & 6 & 9 \\ \hline & 6 & 9 & \boxed{70} \end{array}$$

$(x-1)$ not a factor of numerator

$$\begin{array}{r|rrr} -6 & 6 & 3 & 61 \\ & & -36 & 198 \\ \hline & 6 & -33 & \boxed{259} \end{array}$$

$x+6$ not factor of numerator

$$\frac{x+6}{x^2-36} + \frac{4x-10}{x^2+3x-18}$$

$$\frac{(x+6)}{(x-6)\underline{(x+6)}} + \frac{4x-10}{\underline{(x+6)}(x-3)}$$

Note Simplification will cause more work now

$$\begin{array}{r|rrr} 6 & 5 & -31 & 42 \\ & & 30 & -6 \\ \hline & 5 & -1 & \boxed{36} \end{array}$$

$$\begin{array}{r|rrr} -6 & 5 & -31 & 42 \\ & & -30 & 366 \\ \hline & 5 & -61 & \boxed{408} \end{array}$$

$$\begin{array}{r|rrr} 3 & 5 & -31 & 42 \\ & & 15 & -48 \\ \hline & 5 & -16 & \boxed{-6} \end{array}$$

$x+6,\ x-6,\ x-3$ not factors of numerator

<u>Over lap Method</u>

$$\begin{array}{r|c|l} & \boxed{\underline{(x+6)}} & (x-6) \\ (x-3) & \boxed{\underline{(x+6)}} & \\ \hline (x-3) & \boxed{(x+6)} & (x-6) \quad \text{LCD} \end{array}$$

GCF

$GCF = (x+6)$

$$GCF \cdot rest \quad \underbrace{(x+6)}_{GCF} \cdot \underbrace{(x-6)(x-3)}_{rest} = LCD$$

$$\frac{(x+6)}{(x-6)(x+6)} \cdot \frac{(x-3)}{(x-3)} + \frac{(4x-10)}{(x+6)(x-3)} \cdot \frac{(x-6)}{(x-6)}$$

$$\frac{x^2+6x-3x-18}{LCD} + \frac{4x^2-10x-24x+60}{LCD}$$

$$\frac{x^2+3x-18}{LCD} + \frac{4x^2-34x+60}{LCD} = \boxed{\frac{5x^2-31x+42}{(x+6)(x-6)(x-3)}}$$

answer

$$\frac{3x+5}{x^2-x-30} - \frac{x-4}{x^2-7x+6}$$

$$\frac{3x+5}{(x-6)(x+5)} + \frac{-x+4}{(x-1)(x-6)}$$

Overlap Method

$$\begin{array}{c|c|c} (x+5) & (x-6) & \\ & (x-6) & (x-1) \\ \hline \text{LCD} \quad (x+5) & (x-6) & (x-1) \end{array}$$

GCF • rest method $\underbrace{(x-6)}_{GCF} \cdot \underbrace{(x+5)(x-1)}_{rest} = LCD$

GCF $(x-6)$

$$\frac{(3x+5)}{(x-6)(x+5)} \cdot \frac{(x-1)}{(x-1)} + \frac{(-x+4)}{(x-1)(x-6)} \frac{(x+5)}{(x+5)}$$

$$\frac{3x^2+5x-3x-5}{LCD} + \frac{-x^2+4x-5x+20}{LCD}$$

$$\frac{3x^2+2x-5}{LCD} + \frac{-x^2-1x+20}{LCD}$$

$$\frac{2x^2+1x+15}{LCD} = \boxed{\frac{2x^2+1x+15}{(x-1)(x+5)(x-6)}}$$

$$\begin{array}{r|rrr} 1 & 2 & 1 & 15 \\ & & 2 & 3 \\ \hline & 2 & 3 & 18 \end{array} \qquad \begin{array}{r|rrr} -5 & 2 & 1 & 15 \\ & & -10 & 45 \\ \hline & 2 & -9 & 60 \end{array} \qquad \begin{array}{r|rrr} 6 & 2 & 1 & 15 \\ & & 12 & 78 \\ \hline & 2 & 13 & 93 \end{array} \leftarrow$$

$(x-1)$, $(x+5)$, $(x-6)$ not factors

$$\frac{(x+9)}{x^2+5x-6} + \frac{5x-7}{x^2+12x+36}$$

$$\frac{x+9}{(x+6)(x-1)} + \frac{5x-7}{(x+6)(x+6)}$$

GCF $(x+6)$

Overlap method $(x+6)(x-1)$

$x+6 \quad (x+6)$

$$\boxed{(x+6)(x+6)(x-1) \quad \text{LCD}}$$

GCF · rest method $\underbrace{(x+6)}_{\text{GCF}} \underbrace{(x+6)(x-1)}_{\text{rest}} = \text{LCD}$

$$\frac{(x+9)}{(x+6)(x-1)} \cdot \frac{(x+6)}{(x+6)} + \frac{(5x-7)}{(x+6)(x+6)} \cdot \frac{(x-1)}{(x-1)}$$

$$\frac{x^2+9x+6x+54}{\text{LCD}} + \frac{5x^2-7x-5x+7}{\text{LCD}}$$

$$\frac{x^2+15x+54}{\text{LCD}} + \frac{5x^2-12x+7}{\text{LCD}}$$

$$\frac{6x^2+3x+61}{\text{LCD}} = \boxed{\frac{6x^2+3x+61}{(x+6)(x+6)(x-1)}}$$

$1 \rfloor$ 6 3 61
6 9
6 9 $\lfloor$70 x

$-6 \rfloor$ 6 3 61
-36 198
6 -33 $\lfloor$259 x

$(x-1)$ & $(x+6)$ not factors of numerator