Rational Functions 2a - Adding & Subtracting with Like Denominators

Standards:A-APR.7, A-SSE.1a

GLO: #3 Complex Thinker

Math Practice: #7 - Look for & make use of Structure

Learning Target
How do you add & subtract rational functions?

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Review:

Simplify: $\frac{3}{5}+\frac{1}{5} \rightarrow \frac{3+1}{5} \rightarrow \frac{4}{5}$

To add/subtract rational expressions, they need to have **same denominators.**

(erase to show)

Once they have the same denominator, just add or subtract the numerators and put it over the common denominator.

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State the excluded values (i.e. values of x for which the expression is not defined), then perform the indicated operation.

Operation:	Rational Expression:	Excluded Value:
Add or Subtract	$\frac{3}{2x}-\frac{7}{2x}=$	$2x\neq 0$, $x\neq 0$

$\frac{3-7}{2x} \rightarrow \frac{-4}{2x} \rightarrow -\frac{2}{x}$

Answer: $-\frac{2}{x};x\neq 0$

$\frac{2x+5}{x+3}+\frac{-7}{x+3}$

$x+3\neq 0$, $x\neq -3$

$\frac{2x+5-7}{x+3} \rightarrow \frac{2x-2}{x+3}$

$\frac{2(x-1)}{(x+3)}$

Answer: $\frac{2(x-1)}{x+3};x\neq -3$

Operation:	Rational Expression:	Excluded Value:
Add or Subtract	$\frac{-x+8}{x^2+6x-7}-\frac{-2x+1}{x^2+6x-7}$	$x^2+6x-7\neq 0$

$(x+7)(x-1)\neq 0$

$x+7\neq 0 \quad x-1\neq 0$

$x\neq -7 \quad x\neq 1$

$x\neq -7, 1$

$\frac{(-x+8)-(-2x+1)}{x^2+6x-7}$

$\frac{-x+8+2x-1}{x^2+6x-7}$

$\frac{x+7}{x^2+6x-7}$

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

$\frac{1}{(x-1)}$

Answer $\frac{1}{x-1}; x\neq -7,1$

Operation:	Rational Expression:	Excluded Value:

Add or Subtract

$$\frac{p^2-5p-21}{5p^2+20p+15}+\frac{6p+15}{5p^2+20p+15}$$

$\frac{p^2-5p-21+6p+15}{5p^2+20p+15}$

$\frac{p^2+p-6}{5p^2+20p+15}$

$\frac{(p+3)(p-2)}{5(p^2+4p+3)}$

$\frac{(p+3)(p-2)}{5(p+3)(p+1)}$

$\frac{(p+3)(p-2)}{5(p+3)(p+1)}$

$5p^2+20p+15\neq 0$

$5(p^2+4p+3)\neq 0$

$5(p+3)(p+1)\neq 0$

$5\neq 0$ $p+3\neq 0$ $p+1\neq 0$

$p\neq -3$, $p\neq -1$

$p\neq -3,-1$

Answer

$$\frac{p-2}{5(p+1)};\ p\neq -3,-1$$

Operation:	Rational Expression:	Excluded Value:
Add or Subtract	$\frac{10n^2+30n+13}{30n+36}-\frac{5n^2+9n-5}{30n+36}$	

$\frac{(10n^2+30n+13)-(5n^2+9n-5)}{30n+36}$

$\frac{10n^2+30n+13-5n^2-9n+5}{30n+36}$

$\frac{5n^2+21n+18}{30n+36}$

$\frac{(5n+6)(n+3)}{6(5n+6)}$

$\frac{(n+3)}{6}$

$30n+36\neq 0$

$6(5n+6)\neq 0$

$6\neq 0$ $5n+6\neq 0$

$5n\neq -6$

$n\neq -\frac{6}{5}$

Answer $\frac{n+3}{6}; n\neq -\frac{6}{5}$