Monday, May 9, 2016 9:17 AM

Pre-Calculus 11
7.4 Adding & Subtracting Rational Expressions with Binomial & Trinomial Denominators
Name: _____

The strategies for adding and subtracting rational expression with monomial denominators can be used to add and subtract rational expressions with binomial ($x+2$) and trinomial (x^2+4x-4) denominators. To determine a common denominator, factor all of the denominators, then write the product of the different factors with the greatest exponent of each factor.

Example 1: Simplify.

a. $\frac{p-1}{p-2}+\frac{p+3}{p+1}$

NPV's $p \neq 2$, $p \neq -1$ lcd: $(p-2)(p+1)$

$= \frac{(p+1)(p-1)+(p-2)(p+3)}{(p-2)(p+1)}$ (diff of squares)

$= \frac{p^2-1+p^2+p-6}{(p-2)(p+1)}$

$= \frac{2p^2+p-7}{(p-2)(p+1)}$

b. $\frac{2}{e-3}-\frac{3e}{9-e^2}$

NPV's $e \neq 3$

$9-e^2 \neq 0$
$e^2 \neq 9$
$e \neq \pm 3$

$= \frac{2}{e-3}-\frac{3e}{(3-e)(3+e)}$

$= \frac{2}{e-3}+\frac{3e}{(e-3)(3+e)}$ ($3+e$, $(3+e)$)

$= \frac{2(3+e)+3e}{}$ $= \frac{6+2e+3e}{}$ $= \frac{5e+6}{}$

$= \frac{2(3+e)+3e}{(e-3)(3+e)} = \frac{6+2e+3e}{(e-3)(3+e)} = \frac{5e+6}{(e-3)(3+e)}$

YOU TRY

* Factor first* before NPV's.

c. $\frac{7}{x^2-49}+\frac{3}{x^2+14x+49}$

NPV's: $x \neq 7$, $x \neq -7$

lcd: $(x+7)(x+7)(x-7)$ $(x+7)^2(x-7)$

$= \frac{7}{(x-7)(x+7)} + \frac{3}{(x+7)(x+7)}$

$= \frac{7(x+7)+3(x-7)}{(x+7)^2(x-7)}$

$= \frac{7x+49+3x-21}{(x+7)^2(x-7)}$

$= \frac{10x+28}{(x+7)^2(x-7)} = \frac{2(5x+14)}{(x+7)^2(x-7)}$ ← simplify!

d. $\frac{n-3}{n^2+3n-18}-\frac{n-2}{n^2+n-20}$

NPV's: $n \neq -6$, $n \neq 3$, $n \neq -5$, $n \neq 4$

lcd: $(n+6)(n+5)(n+4)$

$= \frac{n-3}{(n+6)(n-3)} - \frac{n-2}{(n+5)(n-4)}$

$= \frac{(n+5)(n-4)-(n-2)(n+6)}{(n+6)(n+5)(n-4)}$

$= \frac{n^2+n-20-[n^2+4n-12]}{(n+6)(n+5)(n-4)}$

$= \frac{-3n-8}{(n+6)(n+5)(n-4)}$

$(n+6)(n+5)(n-4$

Pre-Calculus 11
7.4 Adding & Subtracting Rational Expressions with Binomial & Trinomial Denominators
Name: _____

Example 2: On a canoe trip. Carolyn paddled upstream a distance of 10 km. On the return trip downstream, the average speed of the canoe was 5 km/h greater than its speed upstream. Write and then simplify an expression for Carolyn's total paddling time in terms of the average speed upstream.

① Recall: time $= \frac{\text{distance}}{\text{avg. speed}}$.

② Let x = Carolyn's speed going upstream

$$\frac{10}{x} + \frac{10}{x+5} = t$$

$$\frac{10(x+5)+10x}{x(x+5)} = t$$

$$\frac{10x+50+10x}{x(x+5)} = t$$

$$\frac{20x+50}{x(x+5)} = t$$

Assignment
p. 566-573 #3bd, 5-7, 10, 12, 13

In the lessons to come in this unit we will be solving these type of questions instead of