MATH 118: Quiz 3

Name: Key

Directions:

- Show your thought process (commonly said as "show your work") when solving each problem for full credit.
- If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- Good luck!

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1. Subtract and simplify:

$$\frac{2}{x+3} - \frac{1}{x^2+7x+12}$$

Before you start:

(1) Observe: problem is subtraction of fractional expressions.

(2) Choose strategy: Fraction property #4 says we need same factors in denominator.

(3) Act: Find LCD.

$$\frac{2}{x+3} - \frac{1}{x^2+7x+12} = \frac{2}{(x+3)} - \frac{1}{(x+4)(x+3)}$$

missing $(x+4)$ as a factor

$1 \cdot 3 \cdot 4 \rightarrow 3+4=7$ ✓

multiply by 1

$$= \frac{(x+4)}{(x+4)} \cdot \frac{2}{(x+3)} - \frac{1}{(x+4)(x+3)}$$

frac law #1

$$= \frac{2(x+4)}{(x+4)(x+3)} - \frac{1}{(x+4)(x+3)}$$

$$\overset{\text{dist law}}{=} \frac{2x+8}{(x+3)(x+4)} - \frac{1}{(x+3)(x+4)}$$

$$\overset{\text{frac law \#}}{=} \frac{2x+8-1}{x+4}$$

$$= \frac{+7}{(x+3)(x+4)}$$

get rid of nested fraction.

strategy: remove internal denominators.

2. Simplify the compound fraction:

$$\frac{\frac{1}{x-1}-1}{2-\frac{1}{x-2}}$$

multiply by 1 $= \frac{(x-1)(x-2)}{(x-1)(x-2)} \cdot \frac{\frac{1}{x-1}-1}{2-\frac{1}{x-2}}$

frac law #1 $= \frac{(x-1)(x-2)\left(\frac{1}{x-1}-1\right)}{(x-1)(x-2)\left(2-\frac{1}{x-2}\right)}$

dist law + frac law 1 $= \frac{\frac{(x-1)(x-2)}{(x-1)} - (x-1)(x-2)}{2(x-1)(x-2) - \frac{(x-1)(x-2)}{(x-2)}}$

frac law #5 $= \frac{(x-2) - (x-1)(x-2)}{2(x-1)(x-2) - (x-1)}$ → continued.

2 terms. Factor!

3. Solve for x:

$$ax - b(x+c) + d = e + gx$$

$ax - bx - bc + d = e + gx$ dist law

$ax - bx - gx = e - d + bc$ terms w/ x on one side

$x \cdot (a-b-g) = e - d + bc$ convert x to factor

$x = \frac{e-d+bc}{a-b-g}$ isolate x

2 cont. GCF $= \dfrac{(x-2)(1-(x-1))}{(x-1)(2(x-2)-1)}$

expand and simplify

dist law $= \dfrac{(x-2)(1-x+1)}{(x-1)(2x-4-1)}$

$x)$

$(x-1)(2x-5)$

all factors. You are done b/c directions said to "simplify" which means convert to factors in the context of rational expressions.