Precalc: Algebra 2 Unit 5 Name:

Lesson 5 Just Act Rational

1. Do you remember how to multiply fractions? Someone in your group does. With your group, multiply the following fractions. Simplify your answer.

a. $\frac{3}{4} \cdot \frac{5}{6} = \frac{3 \cdot 5}{4 \cdot 6} = \frac{15}{24} = \frac{\cancel{3} \cdot 5}{\cancel{3} \cdot 8} = \frac{5}{8}$

multiply across!

simplify!

b. $\frac{x(x-3)}{(x+1)} \cdot \frac{5}{x^2} = \frac{5x(x-3)}{x^2(x+1)} = \frac{5 \cdot \cancel{x} \cdot (x-3)}{x \cdot \cancel{x} \cdot (x+1)} = \frac{5(x-3)}{x(x+1)}$

$x \neq -1$ $x \neq 0$

c. $\frac{(x+1)(x-2)}{(x+2)} \cdot \frac{(x+5)}{(x-2)(x+2)} = \frac{(x+1)\cancel{(x-2)}(x+5)}{(x+2)\cancel{(x-2)}(x+2)} = \frac{(x+1)(x+5)}{(x+2)(x+2)}$

$= \frac{(x+1)(x+5)}{(x+2)^2}$

$x \neq -2$ $x \neq 2$ $x \neq -2$

but watch out! if $x = 2$, then one of the original fractions will have a "divide by zero" problem

full answer:

$\frac{(x+1)(x+5)}{(x+2)^2}$, $x \neq 2$

(x can't be -2 either, but since that's still a problem for the denominator in our final answer, we don't have to mention it again)

2. Do you remember how to divide fractions? Someone in your group does. With your group, divide the following fractions. Simplify your answer.

a. $\frac{3}{4} \div \frac{5}{6} = \frac{3}{4} \cdot \frac{6}{5} = \frac{18}{20} = \frac{2 \cdot 9}{2 \cdot 10} = \frac{9}{10}$

keep, change, flip!
a.k.a.
multiply by the reciprocal!

b. $\frac{(x-2)}{(x+2)} \div \frac{(x+5)}{x(x+2)} = \frac{x-2}{x+2} \cdot \frac{x(x+2)}{x+5} = \frac{x(x+2)(x-2)}{(x+2)(x+5)} = \frac{x(x-2)}{x+5}$

$x \neq -2$ $\quad x \neq 0$ $\quad x \neq -5$

but watch out! x can't be -2 or 0

answer: $\frac{x(x-2)}{x+5}$, $x \neq -2, x \neq 0$

c. $\frac{(x+1)(x-6)}{(x+2)} \div \frac{(x+1)}{(x-3)(x+2)} = \frac{(x+1)(x-6)}{x+2} \cdot \frac{(x-3)(x+2)}{x+1}$ $\quad x \neq -1$

$x \neq -2$ $\quad x \neq 3$ $\quad x \neq -2$

$= \frac{(x+1)(x-6)(x-3)(x+2)}{(x+2)(x+1)}$

$= (x-6)(x-3)$, $x \neq -2, x \neq -1, x \neq 3$

3. Do you remember how to add fractions? Someone in your group does. With your group, add the following fractions. Simplify your answer.

a. $\frac{2}{3}+\frac{1}{7}$ $= \frac{2}{3}\cdot\frac{7}{7}+\frac{1}{7}\cdot\frac{3}{3} = \frac{14}{21}+\frac{3}{21} = \boxed{\frac{17}{21}}$

need a common denominator.
$3 \cdot 7 = 21$, which will work.
multiply each fraction by a clever form of 1.

b. $\frac{3}{(x+7)}+\frac{4}{(x-4)}$ $= \frac{3}{x+7}\cdot\frac{x-4}{x-4}+\frac{4}{x-4}\cdot\frac{x+7}{x+7}$

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

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

$= \frac{3x-12+4x+28}{(x+7)(x-4)} = \boxed{\frac{7x+16}{(x+7)(x-4)}}$

c. $\frac{2x-3}{(x+3)}+\frac{x+5}{(x-2)}$ $= \frac{2x-3}{x+3}\cdot\frac{x-2}{x-2}+\frac{x+5}{x-2}\cdot\frac{x+3}{x+3}$

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

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

$= \frac{2x^2-4x-3x+6+x^2+3x+5x+15}{(x+3)(x-2)}$

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

4. Do you remember how to subtract fractions? Someone in your group does. With your group, subtract the following fractions. Simplify your answer.

a. $\frac{7}{8} - \frac{3}{5} = \frac{7}{8}\cdot\frac{5}{5} - \frac{3}{5}\cdot\frac{8}{8} = \frac{35}{40} - \frac{24}{40} = \frac{11}{40}$

a lot like adding!

just remember to subtract the entire second fraction

b. $\frac{3x+1}{(x+5)} - \frac{x-4}{(x-2)} = \frac{3x+1}{x+5}\cdot\frac{x-2}{x-2} - \frac{x-4}{x-2}\cdot\frac{x+5}{x+5}$

$= \frac{(3x+1)(x-2)}{(x+5)(x-2)} - \frac{(x-4)(x+5)}{(x-2)(x+5)}$

$= \frac{(3x+1)(x-2) - (x-4)(x+5)}{(x+5)(x-2)}$

$= \frac{3x^2 - 6x + x - 2 - (x^2 + 5x - 4x - 20)}{(x+5)(x-2)}$

$= \frac{3x^2 - 6x + x - 2 - x^2 - 5x + 4x + 20}{(x+5)(x-2)}$

$= \frac{2x^2 - 6x + 18}{(x+5)(x-2)}$

5. Is $\frac{1}{a+b} = \frac{1}{a} + \frac{1}{b}$? Explain.

no!

for example,

$\frac{1}{2+5} = \frac{1}{7}$

$\frac{1}{7} \neq \frac{1}{2} + \frac{1}{5}$