Khan Academy

Quiz:

Rational Relationships Quiz 1 and 2

1. Log in (haven't signed up? please see me)
2. Click your name in top right.
   a. notifications --> assignments
   b. quiz 1 and then quiz 2

How to type your answers into Khan:

...say you factored it and got this...

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

Type your canceled and expanded answer

$0 = x(x+3)(x-1)$

$0 \quad -3 \quad 1$

→ undefined = 0

Multiple choice: Select all values that make the denominator = 0.

When can I cancel?!

$\frac{2+3}{2}$ No! $\frac{5}{2} \neq 3$

$\frac{2(3)}{2}$ yes! $\frac{6}{2} = 3$ ✓

$\frac{2^2+3}{2^2}$ No! $\frac{7}{4} \neq 3$

$\frac{2^2(3)}{2^2}$ Yes! $\frac{12}{4} = 3$ ✓

$\frac{x^2+x+1}{x^2}$ No! if $x=2$ or ANY #! $\frac{7}{4} \neq 3$

$\frac{x^2(x+1)}{x^2}$ yes! if $x=2$ $\frac{12}{4} = 3$ ✓

$\frac{(x+2)(x-3)}{x^2+x-3}$ No! if $x=2$ $\frac{-4}{3} \neq \frac{4}{4}$

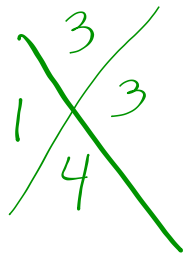
$\frac{(x+2)(x-3)}{(x-5)(x-3)}$ yes! if $x=2$ $\frac{-4}{3} = \frac{-4}{3}$ ✓

Additional Factoring Methods:

Ex1: $x^{12} + 4x^6 + 3$

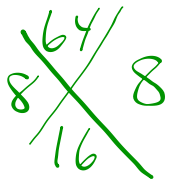
$x^2 + 4x + 3$

$(x^6 + 1)(x^6 + 3)$



Ex2: $x^2 + 16xy + 64y^2$

$(x + 8y)(x + 8y)$



Perfect Squares

Ex 3: $25x^2 - 81$

$(5x)^2 - 9^2$

$(5x + 9)(5x - 9)$

Ex4: $49x^2 + 14xy + y^2$

$(7x)^2 \qquad y^2$

$(7x + y)(7x + y)$

Ex 5: Box Method vs. Linearly Expand

ax^2+bx+c

$a \cdot c$

$f_1 \quad f_2$

b

ax^2+bx+c

f_1x+f_2x

ax^2	f_1x
f_2x	c

take out greatest common factor

ax^2+bx+c

f_1x+f_2x

$(ax^2+f_1x)(f_2x+c)$

Try it!

$3x^2-13x-30$

$(3x+5)$

$3x^2$	$5x$
$-18x$	-30

x

-6

$(x-6)(3x+5)$

-90

$5 \quad -18$

-13

-90

1 90
2 45
3 30
5 18
6 15
9 10

$3x^2-13x-30$

$(3x^2+5x)(-18x-30)$

$x(3x+5)-6(3x+5)$

$(x-6)(3x+5)$

RATIONAL EXPRESSIONS Review!

Simplify each expression.

1. $\frac{18m^2n^4}{27m^2n^5}$ ÷9 $\frac{2}{3n}$

2. $\frac{4y-36}{y-9}$

3. $\frac{a^2-13a+42}{a^2+a-56}$ -7 -6 -13 -7 -56 8 $\frac{(a-7)(a-6)}{(a-7)(a+8)}$

4. $\frac{2k^2-k-1}{2k^2+k}$

Find each product. Write all answers in simplest form.

5. $\frac{12b^3c^2}{5ac} \cdot \frac{15a^2b}{3b^2c}$

6. $\frac{2}{2x} \cdot \frac{10x^2+6x}{35x+21}$

7. $\frac{(c^2-25)}{(4c-4)} \cdot \frac{c-1}{(c^2-3c-10)}$

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

8. $\frac{5p^2-8p+3}{2p+14} \cdot \frac{p+7}{10p-6}$

Find each quotient. Write all answers in simplest form.

9. $\frac{5}{3z} \div \frac{20}{7z^2}$

10. $\frac{60}{4g^2-36} \div \frac{12}{g^2+3g}$

11. $\frac{1}{2n-8} \div \frac{6}{2n^2-20n+48}$

12. $\frac{3v^2+4v+1}{v^2-8v-9} \div \frac{3v+1}{v-9}$

Find each sum or difference. Write all answers in simplest form.

13. $\frac{y}{3y^2}+\frac{5y}{3y^2}$

14. $\frac{5u}{u+4}+\frac{20}{u+4}$

15. $\frac{7r+5}{r^2-10r-24}-\frac{4r-1}{r^2-10r-24}$

16. $\frac{x^2+15}{x^2-64}+\frac{13x}{x^2-64}-\frac{2x-9}{x^2-64}$

17. $\frac{9}{4w}-\frac{7}{5w}$

18. $\frac{h-21}{2h-10}+\frac{h+3}{h-5}$

19. $\frac{x^2+4}{x^2-7x+6}-\frac{8}{x-6}$

$\frac{x^2+4}{(x-6)(x-1)}-\frac{8(x-1)}{(x-6)(x-1)}$ $\quad -2\cdot -6=12,\ -2-6=-8$

$\frac{x^2-8x+12}{(x-6)(x-1)}$ $\quad -6\cdot -1=6,\ -6-1=-7$

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

20. $\frac{13m+21}{6m^2+5m-4}+\frac{1}{3m+4}$

Name: _____ **Unit 10:** Rational Expressions

Date: _____ **Per:** _____ **Homework 6:** Rational Expressions Review

**** This is a 2-page document! ****

Simplify each expression.

1. $\frac{24x^2y}{30x^2y^3}$

2. $\frac{m^2-9m}{m^2-5m-36}$

$\frac{m(m-9)}{(m-9)(m+4)}$

$\frac{m}{m+4}$

-36, -9, 4, -5

Perform the indicated operation. Write all answers in simplest form.

3. $\frac{2c-10}{c+4} \cdot \frac{c^2-16}{c-5}$

4. $\frac{3k+24}{k^2-2k+1} \cdot \frac{9k-9}{k^2+9k+8}$

$\frac{3(k+8)}{(k-1)(k-1)} \cdot \frac{9(k-1)}{(k+8)(k+1)}$

$\frac{27}{(k+1)(k-1)}$

$+1$, -1, -1, -2

5. $\frac{5a^2b^2}{3ab^2} \div \frac{10a^2b}{9a^3}$

6. $\frac{a^2-a-12}{12} \times \frac{2a^2+7a+3}{16a+8}$

$\frac{(a-4)(a+3)}{4} \cdot \frac{8(2a+1)(a+3)}{(2a+1)(a+3)}$

$\frac{2(a-4)}{3}$

1, 2, 3, 4

like BOX. linear method:

$2a^2+1a+6a+3$

$a(2a+1)+3(2a+1)$

$(a+1)(a+3)$

6, 1, 6, 1

7. $\frac{7x}{10} - \frac{x}{10}$

8. $\frac{7r+3}{r^2-1} - \frac{6r+4}{r^2-1}$ same denom ✓

$\frac{(7r+3)-(6r+4)}{r^2-1} = \frac{r-1}{(r^2-1)} = \frac{r-1}{(r+1)(r-1)}$

$-1 \quad -1$

$\frac{1}{r+1}$

9. $\frac{2y-17}{y^2+4y-21} + \frac{3y+2}{y^2+4y-21}$

10. $3\left(\frac{5}{2k} + \frac{1}{6k}\right)$

$\frac{15}{6k} + \frac{1}{6k} = \frac{16}{6k} \div 2$

$\frac{8k}{3}$

11. $\frac{5x+11}{x^2+5x+6} - \frac{4}{x+3}$

12. $\left(\frac{n^2-12n+19}{3n^2-14n-5}\right) \div \left(\frac{1}{n-5}\right)^{3n+1}$

$\frac{3n^2-15n+1n-5}{3n(n-5)+1(n-5)}$

$(n-5)(3n+1)$

common denom.

$\frac{n^2-12n+19}{(3n+1)(n-5)} + \frac{3n+1}{(n-5)(3n+1)} = \frac{n^2-9n+20}{(n-5)(3n+1)}$

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

13. $\frac{15}{8t-16} + \frac{3t-12}{8} \cdot \frac{3}{t^2-6t+8}$

Left to Right

$= 6 \div 2 \times 4$

$3 \times 4 = 12$ ✓

VS

$= 6 \div 2 \times 4$

$6 \div 8 = \frac{6}{8} = \frac{3}{4}$ ✗

order matters!

14. $\left(\frac{4a}{a^2+11a+30}\right) \div \left(\frac{6a^3-6a^2}{2a^2+11a-6} \cdot \frac{2a^2+8a-10}{8a^3}\right)$

$\frac{2a^2+12a-1a-6}{2a(a+6)-1(a+6)}$ $2(a^2+4a-5)$

$(a+6)(2a-1)$

$= \frac{4a}{(a+5)(a+6)} \div \frac{(a+6)(2a-1)}{6a^2(a-1)} \cdot \frac{2(a-1)(a+5)}{8a^3}$

$\frac{8a(2a-1)}{48a^5} = \frac{2a-1}{6a^4}$

15. $\left(\frac{1}{3c} - \frac{c+3}{6c^2}\right) \div \frac{2c^2-3c-9}{30c^3}$

16. $\left(\frac{3w^2-2w-1}{w^2-w-6}\right) \div \left(\frac{w^2-3w-10}{3w^2-14w-5} + \frac{2w-18}{w^2-9}\right)$

$\frac{3w^2-3w+1w-1}{3w(w-1)+1(w-1)}$ $\frac{3w^2-15w+1w-5}{3w(w-5)+1(w-5)}$

$(3w+1)(w-1)$ $(3w+1)(w-5)$

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

$(w+3)\left[\frac{w-1}{w-3}\right] + \frac{2w-18}{(w+3)(w-3)}$

$\frac{w^2+2w-3+2w-18}{(w+3)(w-3)} = \frac{w^2+4w-21}{}$

$\frac{(w+7)(w-3)}{(w+3)(w-3)}$