

LESSON 8-1 Multiplying and Dividing Rational Expressions

I can... simplify rational expressions using multiplication and division.

Sit in new seats!

Apr 8-2:17 PM

How to Factor a Quadratic Reminder

Factoring: $x^2 + 7x + 12$

$$a=1 \quad b=7 \quad c=12$$

$$(x+3)(x+4)$$

a.c	b
12	7
1 · 12	
2 · 6	
(3 · 4)	

Apr 9-10:16 AM

$$\begin{array}{c}
 (x+3)(x-3) \\
 \leftarrow \\
 x^2 - \cancel{3x} + \cancel{3x} - 9 \\
 \leftarrow \\
 x^2 - 9 \\
 \begin{array}{c} \uparrow \quad \uparrow \\ x^2 - 3^2 \end{array} \leftarrow \text{Difference of Squares}
 \end{array}$$

Dec 5-11:52 AM

Factor Differences of Squares**N** A. Factor $m^2 - 64$.**O** Write in the form $a^2 - b^2$.

T $m^2 - 8^2$

Answer: $(4y + 9z)(4y - 9z)$

E $(m+8)(m-8)$

S B. Factor $16y^2 - 81z^2$.

Answer: $3b(b+3)(b-3)$

$(4y+9z)(4y-9z)$

C. Factor $3b^3 - 27b$.

$3b(b^2 - 9)$

$3b(b+3)(b-3)$

Nov 22-11:26 AM

W Factor

H
I
T
E
B
O
A
R
D
S

1. $b^2 - 9$

$$(b + 3)(b - 3)$$

2. $25a^2 - 36b^2$

$$(5a + 6b)(5a - 6b)$$

3. $5x^3 - 20x$

$$5x(x + 2)(x - 2)$$

Nov 22-11:27 AM

Simplify

1.
$$\frac{3y(y+7)}{(y+7)(y^2-9)}$$

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

undefined when

$$(y+7)(y^2-9) = 0$$

$$(y+7)(y-3)(y+3) = 0$$

$$y+7=0 \quad y-3=0 \quad y+3=0$$

Tell me when its undefined.

$$\text{undef at } -7, 3, -3$$

$$y \neq -7, +3, -3$$

Apr 9-7:33 AM

Simplify

2. $\frac{p^2 + 2p - 3}{p^2 - 2p - 15}$

$\begin{array}{r} -3 \mid 2 \\ 3 \div 1 \end{array}$

$\begin{array}{r} -15 \mid -2 \\ 3 \div 5 \end{array}$

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

$\frac{p-1}{p-5}$

$p \neq -3, 5$

Factor
Cancel
Find where undef.
 $(p+3) \neq 0$ $p-5 \neq 0$

Tell me when its undefined.

Apr 9-7:38 AM

Simplify

3. $\frac{a^4b - 2a^4}{2a^3 - a^3b}$

$2-b = -b+2$

Side note:
 $\rightarrow (-b+2)$
 $-1(b-2)$

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

$= \frac{a^4 \cancel{(b-2)}}{-a^3 \cancel{(b-2)}}$

$= -a$

Undef:
 $-a^3(b-2) \neq 0$
 $-a^3 \neq 0$
 $a \neq 0$ $b-2 \neq 0$
 $b \neq 2$

Tell me when its undefined.

Apr 9-8:54 AM

You Try!! Simplify Tell me when its undefined.

$$4. \frac{x(x+5)}{(x+5)(x^2-16)} = \frac{x}{x+5} \cdot \frac{x+5}{x^2-16}$$

$$5. \frac{p^2 + 5p + 6}{p^2 + 8p + 15}$$

$$6. \frac{x^4y - 3x^4}{3x^3 - x^3y}$$

Apr 9-8:53 AM

Multiplying Rational Exponents

(Just like fractions, multiply straight across)

$$\frac{\cancel{1}8\cancel{x}}{\cancel{3}21y^{\cancel{3}}} \cdot \frac{\cancel{1}7y^{\cancel{2}}}{\cancel{2}16x^{\cancel{2}}} = \frac{1}{6x^2y}$$

Apr 9-8:55 AM

Multiply and Simplify.

$$8. \frac{(k-3)(1-k^2)}{(k+1)(k^2-4k+3)}$$

Apr 9-8:58 AM

You Try!! Multiply and Simplify.

$$9. \frac{3x}{15y} \cdot \frac{5y^2}{2x^3}$$

$$10. \frac{x-3}{x+2} \cdot \frac{x^2+5x+6}{x^2-9}$$

Apr 9-8:58 AM

Divide Rational Exponents

(Multiply by reciprocal)

"KFC"

$$\frac{10mk^2}{3c^2d} \div \frac{5m^5}{6c^2d^2}$$

$$\frac{\cancel{2}10\cancel{m}k^2}{\cancel{1}3\cancel{c}^2\cancel{d}} \cdot \frac{\cancel{2}6\cancel{c}^2\cancel{d}^2}{\cancel{1}5\cancel{m}^5} = \frac{4k^2d}{m^4}$$

K- Keep 1st

F- Flip 2nd

Change sign.

$$c \neq 0 \quad d \neq 0 \quad m \neq 0$$

Apr 9-8:57 AM

Divide and Simplify.

$$\begin{array}{r} -2 \overline{) 1} \\ +2 \cdot 1 \\ \hline \end{array} \quad \begin{array}{r} 2 \overline{) 3} \\ 2 \cdot 1 \\ \hline \end{array}$$

11.
$$\frac{2d+6}{d^2+d-2} \div \frac{d+3}{d^2+3d+2}$$

$$\frac{2d+6}{(d+2)(d-1)} \cdot \frac{d^2+3d+2}{d+3}$$

$$\frac{\cancel{2}(\cancel{d+3})}{(\cancel{d+2})(d-1)} \cdot \frac{(\cancel{d+2})(d+1)}{\cancel{(d+3)}}$$

$$\frac{2(d+1)}{(d-1)} \quad d \neq -2, 1, -3 \quad (d+2)(d-1)(d+3) \neq 0$$

Apr 9-8:58 AM

Divide and Simplify.

$$12. \frac{\frac{9x^2 - 4y^2}{x^3}}{2y - 3x}$$

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

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

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

undef

$$(3x + 2y)(3x - 2y)(x)^0$$

$$\frac{3x + 2y}{3} \neq 0 \quad \frac{3x}{3} = \frac{-2y}{3} \quad x \neq \frac{-2y}{3}$$

Apr 9-9:00 AM

You Try!! Divide and Simplify.

$$13. \frac{3x^2y}{20ab} \div \frac{6xy}{5a^2b^3}$$

$$14. \frac{3d + 9}{d^2 + 4d + 3} \div \frac{d + 2}{d^2 + 5d + 4}$$

$$15. \frac{\frac{a^2}{a^2 - 9b^2}}{\frac{a^4}{a + 3b}}$$

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Homework 8.1

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Apr 9-10:27 AM