LESSON MAKER PRO

Rational Expression Remix

Combine, simplify, and interpret rational expressions.

HIGH SCHOOL · MA.912.AR.1.10

MA.912.AR.1.10 "Solve mathematical and real-world problems involving addition, subtraction, multiplication or division of rational algebraic expressions."

NAME _____ DATE _____

WORK WITH FACTORS

When you add or subtract rational expressions, use a common denominator and combine the numerators. When you multiply, factor when helpful and cancel shared factors. When you divide, multiply by the reciprocal of the second expression before simplifying.

WORKED EXAMPLE

Simplify: $(x+2)/(x-3) + 4/(x-3)$

1. The denominators match, so combine the numerators: $(x+2+4)/(x-3)$.
2. Combine like terms: $(x+6)/(x-3)$.
3. Keep the restriction $x \neq 3$.

Answer: $(x+6)/(x-3)$, $x \neq 3$

PRACTICE 6 problems

1 Simplify: $(7x-1)/(x+9) + (x+8)/(x+9)$

ANSWER _____

2 Simplify: $13/(x-5) - 8/(x+1)$

ANSWER _____

3 Simplify: $(x-7)/(x+8) \cdot (x+8)/(x+11)$

ANSWER _____

4 Simplify: $(x-9)/(x+10) \div (x-12)/(x+10)$

ANSWER _____

5 Simplify: $11/(x-12) + 13/(x+12)$

ANSWER _____

6 Simplify: $(x+14)/(x-11) \cdot (x-11)/(x+7)$

ANSWER _____

APPLY IT Show your work

1 A student media team exports a 45-clip highlight reel at a rate of x clips per hour. After an upgrade, the team exports x+5 clips per hour. Write and simplify an expression for the number of hours saved by the upgrade.

WORK SPACE

ANSWER _____

2 A school store's cost to make one custom hoodie is (x+8)/(x-1) dollars. An order contains x-1 hoodies, where x is a whole number greater than 1. Write and simplify an expression for the total cost of the order.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Jae says that (x(x+15))/((x-15)(x+15)) ÷ ((x+15)/(x-15)) equals 1 because the factors x+15 and x-15 cancel. Is Jae correct? Simplify the expression and explain why Jae's cancellation is invalid.

WORK SPACE AND ANSWER

ANSWER KEY

Rational Expression Remix

HIGH SCHOOL · MA.912.AR.1.10

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: (7x-1)/(x+9) + (x+8)/(x+9)	**(8x+7)/(x+9), x ≠ -9**
2	Simplify: 13/(x-5) - 8/(x+1)	**(5x+53)/((x-5)(x+1)), x ≠ 5, -1**
3	Simplify: (x-7)/(x+8) · (x+8)/(x+11)	**(x-7)/(x+11), x ≠ -8, -11**
4	Simplify: (x-9)/(x+10) ÷ (x-12)/(x+10)	**(x-9)/(x-12), x ≠ -10, 12**
5	Simplify: 11/(x-12) + 13/(x+12)	**(24x-24)/((x-12)(x+12)), x ≠ 12, -12**
6	Simplify: (x+14)/(x-11) · (x-11)/(x+7)	**(x+14)/(x+7), x ≠ 11, -7**

PART 2 · APPLY IT

1. **225/(x(x+5)) hours, x > 0** Subtract the new export time from the original export time: 45/x - 45/(x+5). Use x(x+5) as the common denominator and simplify.
2. **x+8 dollars, x > 1** Multiply the cost per hoodie by the number of hoodies: ((x+8)/(x-1))(x-1). Cancel the shared factor x-1.

CHALLENGE

No. The expression simplifies to x/(x+15), with x ≠ 15, -15. Jae must multiply by the reciprocal before canceling factors, and one factor x+15 remains in the denominator.

Accept algebraically equivalent simplified forms when all restrictions from the original denominators and any divisor are stated. For the challenge, require x/(x+15), x ≠ 15, -15, and a correct explanation about multiplying by the reciprocal before canceling.