Just In Time Quick Check

Standard of Learning (SOL) AII.1a

Strand: Expressions and Operations
Standard of Learning (SOL) AII.1a ***The student will add, subtract, multiply, divide, and simplify rational algebraic expressions.***
Grade Level Skills: ● Add, subtract, multiply, and divide rational algebraic expressions. ● Simplify a rational algebraic expression with monomial or binomial factors. Algebraic expressions should be limited to linear and quadratic expressions. ● Recognize a complex algebraic fraction, and simplify it as a quotient or product of simple algebraic fractions.
Just in Time Quick Check
Just in Time Quick Check Teacher Notes
Supporting Resources: ● VDOE Mathematics Instructional Plans (MIPS) o AII.1a - Rational Expressions (Word) / PDF Version ● VDOE Word Wall Cards: Algebra II (Word) | (PDF) o Expression o Add Polynomials (group like terms) o Subtract Polynomials (group like terms) o Multiply Binomials o Multiply Polynomials o Divide Polynomials (monomial divisor) o Divide Polynomials (binomial divisor) o Factoring (perfect square trinomials) o Factoring (difference of squares) o Factoring (sum and difference of cubes) o Factor by Grouping
Supporting and Prerequisite SOL: AII.1c, A.2a, A.2b, A.2c, 8.14b

SOL AII.1a - Just in Time Quick Check

1. Assuming the denominator does not equal 0, simplify the expression. Show your work/thinking.

$$\frac{x^2 + 2x - 80}{x^2 - 12x + 32}$$

2. Simplify the expression when no denominator equals 0. Show your work/thinking.

$$\frac{x^2 - 2x - 15}{x^2 - 4x - 5} \div (x^2 - 5x)$$

3. Assume no denominators equal 0, simplify the expression. Show your work/thinking.

$$\frac{2x^2 + x - 6}{2x^2 - 9x + 9} \cdot \frac{3x^2 - 14x + 15}{3x^2 + x - 10}$$

4. Write the expression in simplest form. Show your work/thinking.

$$\frac{\frac{x-4}{8x^2}}{\frac{4-x}{16x}}$$

5. Assuming the denominators do NOT equal zero, what is the simplest form of the expression shown. Show your work/thinking.

$$\frac{x-1}{x+2} - \frac{x-2}{x^2-4}$$

6. What is the simplified form of the expression shown where $x \neq 3$? Show your work/thinking.

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

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Common Errors/Misconceptions and their Possible Indications

1. Assuming the denominator does not equal 0, simplify the expression. Show your work/thinking.

$$\frac{x^2 + 2x - 80}{x^2 - 12x + 32}$$

A common error some students may make after correctly factoring each trinomial is to simplify common monomial terms from $\frac{(x+10)}{(x-4)}$ resulting in $\frac{-5}{2}$. This may indicate that some students do not understand that the entire binomial factor must be equivalent to cancel it out. Students may benefit from circling the entire binomial factor to help identify if the factors are equivalent. Teachers may find it beneficial to have students use Desmos to graph the original expression and then graph each step of their work to verify equivalency.

2. Simplify the expression when no denominator equals 0. Show your work/thinking.

$$\frac{x^2 - 2x - 15}{x^2 - 4x - 5} \div (x^2 - 5x)$$

A common error some students may make is to rewrite the expression as a product without expressing the reciprocal of the divisor. This may indicate that some students do not recognize the denominator of the divisor is 1. Teachers may want to have students write the divisor with a denominator of 1 prior to rewriting the expression as a product. Students may benefit from working simpler problems like $\frac{4x^2}{5} \div 2x$ to develop an understanding of the process for dividing rational expressions.

3. Assume no denominators equal 0, simplify the expression. Show your work/thinking.

$$\frac{2x^2 + x - 6}{2x^2 - 9x + 9} \cdot \frac{3x^2 - 14x + 15}{3x^2 + x - 10}$$

A common error some students may make is canceling out all of the terms resulting in an answer of zero. This may indicate that some students believe the result when all binomial terms cancel out is zero instead of one. Teachers may find it beneficial to provide students with a numerical problem like $\frac{3}{5} \cdot \frac{10}{6}$ to help students understand what happens when you can cancel out all factors resulting in one.

4. Write the expression in simplest form. Show your work/thinking.

$$\frac{\frac{x-4}{8x^2}}{\frac{4-x}{16x}}$$

A common error some students may make is to cancel out the expressions $(x - 4)$ and $(4 - x)$ resulting in an answer of 2. This may indicate that some students are not factoring out a negative one to rewrite $(4 - x)$ as $-1(x - 4)$ before reducing. Students may benefit from substituting a value for x into each expression to help them understand that the expressions are not equivalent. Also, it may be beneficial to review factoring expressions with negative 1 as a GCF.

5. Assuming the denominators do NOT equal zero, what is the simplest form of the expression shown. Show your work/thinking.

$$\frac{x-1}{x+2} - \frac{x-2}{x^2-4}$$

A common error some students may make in the simplifying process is to write the resulting expression as $\frac{x^2-4x}{(x+2)(x-2)}$. This may indicate that some students are only distributing the subtraction sign to the x-term and not to both terms in the numerator of the second fraction. Students may benefit from rewriting the problem as addition and distributing the negative prior to factoring or finding a common denominator. Teachers may want to encourage students to use Desmos to graph the given expression and their simplified expression to determine if they are equivalent.

6. What is the simplified form of the expression shown when $x \neq 3$? Show your work/thinking.

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

A common error some students may make is to add the two rational expressions before finding a common denominator. This may indicate the student does not understand that the two fractions cannot be combined until each fraction has been rewritten with an equivalent denominator. It may be beneficial to have students practice numerical problems like $\frac{3}{4}+\frac{2}{5}$ to help students with the process of adding fractions. Then build to problems that do not require factoring like $\frac{4}{x-4}+\frac{2}{x+2}$ before working on addition problems that involve factoring prior to finding a common denominator. Students may also benefit from creating a graphic organizer to help them with the process of adding rational expressions.