Lesson 5.2: Operations on Rational Expressions

Explore Your Understanding Assignment

This assignment includes multiple choice and short answer questions. For multiple choice questions, select the best answer. Each is worth 1 mark. Marks assigned to short answer questions are indicated for each question. Be sure to show all necessary work.

(1) _____ 1. Which rational expression simplifies to $\frac{6x^2+11x}{(2x-1)(x-4)(3x+2)}, x \neq -\frac{2}{3}, \frac{1}{2}, 4$?

A. $\frac{4x}{2x^2-9x+4}+\frac{3x}{3x^2-10x-8}$

B. $\frac{4x}{3x^2-10x-8}-\frac{3x}{2x^2-9x+4}$

C. $\frac{4x}{3x^2-10x-8}+\frac{3x}{2x^2-9x+4}$

D. $\frac{4x}{2x^2-9x+4}-\frac{3x}{3x^2-10x-8}$

(1) _____ 2. The simplified rational expression of $\frac{2x^2-7x-4}{5x^2-16x+3} \cdot \frac{2x^2-7x+3}{5x^2-21x+4}$ is

A. $\frac{4x}{5x-1}, x \neq \frac{1}{5}, 3, 4$

B. $\frac{4x^2-1}{5x-1}, x \neq \frac{1}{5}, 3, 4$

C. $\frac{4x^2-1}{25x^2-10x+1}, x \neq \frac{1}{5}, 3, 4$

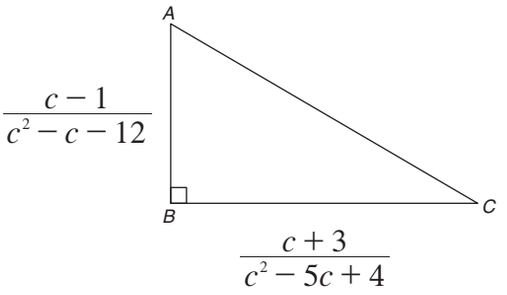
D. $\frac{4x^2-1}{25x^2-1}, x \neq \frac{1}{5}, 3, 4$

(3) 3. Simplify the expression $\frac{p-3}{p-4}+\frac{2p^2+9p+4}{p^2-9p+20}\div\frac{p^2+3p-4}{2p^2-9p-5}$. Indicate any non-permissible values.

(4) 4. Adding, subtracting, multiplying, and dividing rational expressions are similar to performing the same operations on rational numbers. Using examples for each operation, support this statement.

(3) 5. Jules is training for a marathon. She finds that for the first 5 km of her training run, she runs at a constant speed of x km/h. For the remaining 7 km of her training run, her speed reduces by 5 km/h. Write an algebraic expression for the total time Jules takes to run 12 km. Recall that $s = \frac{d}{t}$.

(2) 6. Write a simplified expression, in terms of c, for the area of the given triangle.



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You have completed *Lesson 5.2 Explore Your Understanding Assignment*. Please review all work in *Workbook 5A* to ensure it is your best work. Submit *Workbook 5A* for marking at this time and proceed to *Lesson 5.3* in the *Module*.

Lesson 5.2: Operations on Rational Expressions

Unit 5: Rational Expressions and Equations

Lesson 5.3: Rational Equations

As patterned in *Unit 2* and *Unit 3*, the progression after examining expressions is to look at equations. All of the rules used in simplifying rational expressions are still valid for rational equations. You may find that solving rational equations seems easier because you end up with a solution. After building your skills in solving rational equations, this lesson will conclude with developing rational equations to solve real-life problems.

In *Lesson 5.3*, you will

- Determine non-permissible values when performing operations on rational equations
- Solve rational equations algebraically
- Explain why a value determined in the solution of a rational equation may not be a solution
- Model and solve problems using rational equations

Investigation

Rational Equations

Turn to page 341 in *Pre-Calculus 11* and complete the activity called *Investigate Rational Equations*.

Explore the Lesson

A. Non-Permissible Values and Extraneous Roots

The first step in simplifying rational expressions is to identify any non-permissible values. The importance of this step is even more significant when solving rational equations. After simplifying a rational expression, one or more of the factors in the denominator may have been eliminated, but the eliminated factor still contributes to the list of non-permissible values. When solving rational equations, you may end up with one or more answers that are non-permissible values. These are extraneous roots, similar to those found in *Unit 3, Radicals*, where a solution is found algebraically, but not valid when substituted into the original equation.

Rational Equations

Equations that involve at least one rational expression

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