Algebra 2 Workbook

Rational functions

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SIMPLIFYING RATIONAL FUNCTIONS

■ 1. Simplify the rational function to lowest terms.

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

■ 2. Reduce the fraction to its lowest terms.

$$\frac{10x^2 - 5x + 20}{15x^2}$$

■ 3. Reduce the fraction to its lowest terms.

$$\frac{18y^2 + 6y}{8y}$$

■ 4. Simplify each expression in the difference.

$$\frac{3ab + 2a^2b^2}{5ab} - \frac{12a^3b^3 + 3a^2b^2}{6a^2b^2}$$

■ 5. Simplify each expression in the sum.

$$\frac{2ab^2+3a^2b^3}{a^3b^3}+\frac{2ab^3+b^4}{ab^3}$$

■ 6. Simplify each expression in the difference.

$$\frac{21x^2y^2}{14x^3y}-\frac{24xy+12y}{96y}$$

ADDING AND SUBTRACTING RATIONAL FUNCTIONS

■ 1. Simplify the expression.

$$\frac{2}{3ab}+\frac{b}{4a}+\frac{ab}{6}$$

■ 2. Simplify the expression.

$$\frac{x+1}{x-1}+\frac{2x}{x-5}+\frac{x+2}{x^2-6x+5}$$

■ 3. Simplify the expression.

$$\frac{a}{3xy}+\frac{b}{15y^2}+\frac{c}{5x^3y^2}$$

■ 4. Simplify the expression.

$$\frac{x}{2x^2y}+\frac{y}{3z}+\frac{z}{5yz^2}$$

■ 5. Simplify the expression.

$$\frac{3ab}{4c}+\frac{2bc}{6a^3}+\frac{5}{8ab^2c^3}$$

6. Simplify the expression.

$$\frac{x}{x+6}+\frac{x-6}{x}$$

FACTORING TO FIND A COMMON DENOMINATOR

■ 1. Simplify the expression by combining the two fractions.

$$\frac{x+1}{2x^2+5x-3}+\frac{2}{x+3}$$

■ 2. What is the common denominator of the rational expressions?

$$\frac{x^2-1}{x^2-4} \text{ and } \frac{x+1}{3x^2-3x-6}$$

■ 3. Simplify the expression by combining the two fractions.

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

■ 4. Fill in the blank with the correct term.

$$\frac{2}{\_\_\_\_\_}-\frac{x-2}{x^2-9}=\frac{2(x-3)-4(x-2)}{4(x-3)(x+3)}$$

■ 5. Simplify the expression by combining the two fractions.

$$\frac{4}{x^2-2x-3}-\frac{1}{x^2+5x+4}$$

6. What went wrong in the following simplification?

$$\frac{3}{x^2-25}-\frac{1}{x+5}$$

$$\frac{3-x-5}{(x-5)(x+5)}$$

MULTIPLYING RATIONAL FUNCTIONS

■ 1. Simplify the expression.

$$\frac{25x^2-4}{x^2-36}\cdot\frac{x+6}{5x-2}$$

■ 2. Simplify the expression.

$$\frac{4x^2-49}{9x^2-16}\cdot\frac{3x+4}{2x+7}$$

■ 3. Simplify the expression.

$$\frac{x^2+8x+16}{9x^2+36x+36}\cdot\frac{3x+6}{x+4}$$

■ 4. Simplify the expression.

$$\frac{16x^2+16x+4}{x^2+18x+81}\cdot\frac{x^2-81}{16x^2-4}$$

■ 5. Simplify the expression.

$$\frac{x^2+5x-14}{x^2+2x-3}\cdot\frac{x^2+4x-5}{x^2+9x+14}$$

6. Simplify the expression.

$$\frac{2x^2-13x-24}{3x^2-x-4}\cdot\frac{3x^2-7x+4}{x^2-6x-16}$$

DIVIDING RATIONAL FUNCTIONS

■ 1. Simplify the expression.

$$\frac{2x+16}{9x^2+27x} \div \frac{3x+24}{x+3}$$

■ 2. Simplify the expression.

$$\frac{3x^3-3x^2-6x}{2x^2-14x+24} \div \frac{3x^2+21x}{x^2-8x+15}$$

■ 3. Simplify the expression.

$$\frac{2x^2-13x-7}{12x+6} \div \frac{3x-2}{3x^2-17x+10}$$

■ 4. Simplify the expression.

$$\frac{4x^2+13x+10}{3x+6} \div \frac{3x-1}{3x^2-13x+4}$$

■ 5. Simplify the expression.

$$\frac{4x^2-9}{x^2+12x+36} \div \frac{4x^2-12x+9}{x^2+7x+6}$$

6. Simplify the expression.

$$\frac{15x^2+75x+90}{5x^2+50x+125} \div \frac{x^2-3x+2}{x^2-25}$$

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