LESSON Practice B Solving Rational Equations and Inequalities 8-5

Solve each equation.

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1.
$$x - \frac{6}{x} = 5$$

2. $\frac{15}{4} = \frac{6}{x} + 3$
3. $\overline{x = \frac{3}{x} + 2}$
4. $\frac{4}{x^2 - 4} = \frac{1}{x - 2}$

Solve each inequality by using a graphing calculator and a table.

5. $\frac{6}{x+1} < -3$	$6. \ \frac{x}{x-2} \ge 0$
7. $\frac{2x}{x+5} \leq 0$	$8. \ \frac{-x}{x-3} \ge 0$
Solve each inequality algebraically. 9. $\frac{12}{x+4} \le 4$	10. $\frac{7}{x+3} < -5$
$11. \frac{x}{x-2} > 9$	12. $\frac{2x}{x-5} \ge 3$

Solve.

- 13. The time required to deliver and install a computer at a customer's location
 - is $t = 4 + \frac{d}{r}$, where t is time in hours, d is the distance, in miles, from the warehouse to the customer's location, and r is the average speed of the delivery truck. If it takes 6.2 hours for the employee to deliver and install a computer for a customer located 100 miles from the warehouse, what is the average speed of the delivery truck?

Practice A 8-5 Solving Rational Equations and Inequalities	B-5 Solving Rational Equations and Inequalities
	Solve each equation.
Find the least common denominator (LCD) for each pair.	5. 1. $x - \frac{6}{x} = 5$ 2. $\frac{15}{4} = \frac{6}{x} + 3$
1. $x \text{ and } \frac{3}{x}$ 2. $\frac{3}{x-6} \text{ and } \frac{x}{4}$ 3. $x^2 \text{ and } x^3$	4 2
<u>x</u> $4(x-6)$ x^3	$\frac{x = -1 \text{ or } x = 6}{3. \ x = \frac{3}{x} + 2} \qquad 4. \ \frac{x = 8}{\frac{4}{x^2 - 4}} = \frac{1}{x - 2}$
Solve each equation.	3. $x = \frac{3}{x} + 2$ 4. $\frac{4}{x^2 - 4} = \frac{1}{x - 2}$
4. $2 + \frac{1}{y} = 4$ 5. $\frac{12}{y} + 4 = 3$	x = 3 or $x = -1$ no solution.
$x = \frac{1}{2}$ 6. $x + 2 = \frac{3}{x}$ 7. $\frac{5}{6} + \frac{4}{x} = 3$	Solve each inequality by using a graphing calculator and a table.
6. $x + 2 = \frac{3}{x}$ 7. $\frac{5}{6} + \frac{4}{x} = 3$	5. $\frac{6}{x+1} < -3$ 6. $\frac{x}{x-2} \ge 0$
$x = -3, x = 1$ $x = \frac{24}{13}$	$-3 < x < -1 \qquad x \le 0 \text{ or } x > 2$
	$-3 < x < -1 \qquad x \le 0 \text{ or } x > 2$ 7. $\frac{2x}{x+5} \le 0 \qquad 8. \frac{-x}{x-3} \ge 0$
Solve each inequality.	$-5 < x \le 0 \qquad \qquad 0 \le x < 3$
8. $\frac{8}{x+2} < 2$ 9. $\frac{10}{x-5} \ge 2$	
$x < -2 \text{ or } x > 2$ $5 < x \le 10$	Solve each inequality algebraically.
$\frac{x < -2 \text{ or } x > 2}{10. \frac{3}{x-1} < 3} \qquad $	9. $\frac{12}{x+4} \le 4$ 10. $\frac{7}{x+3} < -5$
$x < 1 \text{ or } x > 2$ $-4 < x \le -1$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
	11. $\frac{x}{x-2} > 9$ 12. $\frac{2x}{x-5} \ge 3$
Solve.	A 2 A 3
12. List all of the extraneous solutions for the equation $\frac{2x}{x+4} = \frac{x}{x-1}$.	$2 < x < \frac{1}{4} \qquad 5 < x \le 15$
x = -4 and 1 because they make the denominators of the original equation equal to 0	Solve.
13. Virat and Ari are washing the family car. When Virat washes the car by	13. The time required to deliver and install a computer at a customer's location
himself it takes him 3 hours, but with Ari helping it takes only 2 hours.	is $t = 4 + \frac{d}{r}$, where <i>t</i> is time in hours, <i>d</i> is the distance, in miles, from the warehouse to the customer's location, and <i>r</i> is the average speed of the
a. In the equation $\frac{1}{3}(2) + \frac{1}{m}(2) = 1$, what does <i>m</i> represent?	delivery truck. If it takes 6.2 hours for the employee to deliver and install a
The length of time it would take Ari to wash the car himself	computer for a customer located 100 miles from the warehouse, what is the average speed of the delivery truck?
b. Find the value of <i>m</i> .	About 45.5 miles per hour
<i>m</i> = 6	
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LESSON Practice C	LESSON Review for Mastery
8-5 Solving Rational Equations and Inequalities	8-5 Solving Rational Equations and Inequalities
8-5 Solving Rational Equations and Inequalities Solve each equation.	
8-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each
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8-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ $r = -\frac{4}{9}$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ no solution.	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$.
8-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ $r = -\frac{4}{9}$ 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$. Step 1 The LCD is x. Multiply each term by x.
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3-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ $r = -\frac{4}{9}$ 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ d = -1	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$. Step 1 The LCD is x. Multiply each term by x. $x(x) + \frac{12}{x}(x) = 7(x)$ This makes the equation a
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B-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ $\frac{r=-\frac{4}{9}}{\frac{9}{x-4}}$ 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ $\frac{d=\frac{1}{5}}{\frac{1}{5}}$ Solve each inequality by using a graphing calculator and a table. 5. $\frac{x-1}{x} < 2$ 6. $\frac{3x}{x+5} = -4$ $\frac{x < -1 \text{ or } x > 0}{\frac{-5 < x \le -3}{7, \frac{2-x}{x+3} \ge 4}}$ Solve each inequality algebraically. 9. $\frac{14}{2} \le \frac{7}{2}$ 10. $\frac{12}{s-5} > 3$ $m < 0 \text{ or } m \ge 4$ 5 < s < 9	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$. Step 1 The LCD is x. Multiply each term by x. $x(x) + \frac{12}{x}(x) = 7(x)$ This makes the equation a quadratic equation. Step 2 Simplify. $x^2 + 12 = 7x$ Step 3 Write in standard form. $x^2 - 7x + 12 = 0$ Set one side equal to 0 to solve a quadratic equation. (x - 3)(x - 4) = 0 Step 5 Set each factor equal to 0. x - 3 = 0 $x - 4 = 0Step 6 Solve each equation.x = 3$ $x = 4$ Always check the solutions Check $x + \frac{12}{x} = 7$
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8-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ $r = -\frac{4}{9}$ 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ x = 7 and x = -1 Solve each inequality by using a graphing calculator and a table. 5. $\frac{x-1}{x} < 2$ 6. $\frac{3x}{x+5} = -4$ $\frac{x < -1 \text{ or } x > 0}{7 \cdot \frac{2-x}{x+3} \ge 4}$ 8. $\frac{x}{4-x} < 3$ $-5 < x \le -3$ 7. $\frac{2-x}{x+3} \ge 4$ 8. $\frac{x}{4-x} < 3$ $\frac{-3 < x \le -2}{2}$ x < 3 OR x > 4 Solve each inequality algebraically. 9. $\frac{14}{m} \le \frac{7}{2}$ 10. $\frac{12}{s-5} > 3$ $\frac{m < 0 \text{ or } m \ge 4}{11 \cdot \frac{7x}{z-4} \ge 6}$ 12. $\frac{-9x}{x+12} < -5$ x < -12 or x > 15 Solve. 13. An artist is designing a picture frame whose length, <i>l</i> , and width, <i>w</i> , satisfy the Golden Ratio, which is $\frac{w}{l} = \frac{1}{l+w}$ if the length of the frame is 24 inches, what is the width of the frame? About 14.83 in. 14. Team A can wash all the windows in the school in x hours. It takes Team B 3 hours longer to do the same job. If the teams work together, they can complete	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$. Step 1 The LCD is x. Multiply each term by x. $x(x) + \frac{12}{x}(x) = 7(x)$ This makes the equation a quadratic equation. Step 2 Simplify. $x^2 + 12 = 7x$ Step 3 Write in standard form. $x^2 - 7x + 12 = 0$ Set one side equal to 0 to solve a quadratic equation. (x - 3)(x - 4) = 0 Step 4 Factor the quadratic equation. (x - 3)(x - 4) = 0 Step 5 Set each factor equal to 0. x - 3 = 0 $x - 4 = 0Step 6 Solve each equation.x = 3$ $x = 43 + \frac{12}{3} = 3 + 4 = 7\sqrt{4} + \frac{12}{4} = 4 + 3 = 7\sqrt{4}Solve each equation.1. \frac{x}{2} + 1 = \frac{4}{x} 2. x - \frac{6}{x} = 1 3. x = 4 + \frac{5}{x}\frac{x}{2}(2x) + 1(2x) = \frac{4}{x}(2x) x(x) - \frac{6}{x}(x) = 1(x)x^2 + 2x = 8 \frac{x^2 - 6 = x}{x^2 - x - 6 = 0} \frac{x^2 - 4x - 5 = 0}{x^2 - 4x - 5 = 0}$
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3-5 Solving Rational Equations and Inequalities Solve each equation. 1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$ $r = -\frac{4}{9}$ 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ x = 7 and x = -1 3. $-\frac{6}{x} + 1 = \frac{7}{x^2}$ 4. $\frac{2}{d+2} + \frac{8}{d-2} = \frac{14}{d^2-4}$ $d = \frac{1}{5}$ Solve each inequality by using a graphing calculator and a table. 5. $\frac{x-1}{x} < 2$ 6. $\frac{3x}{x+5} = -4$ $\frac{x < -1 \text{ or } x > 0}{2 - \frac{x}{x+3} \ge 4}$ 8. $\frac{x}{4-x} < 3$ $\frac{-3 < x \le -2}{2}$ 10. $\frac{12}{s-5} > 3$ $\frac{m < 0 \text{ or } m \ge 4}{11. \frac{72}{z-4} \ge 6}$ 11. $\frac{72}{z-4} \ge 6$ 12. $\frac{-9x}{x+12} < -5$ $\frac{x < -12 \text{ or } x > 15}{2 - 5}$ Solve. 13. An artist is designing a picture frame whose length, <i>l</i> , and width, <i>w</i> , satisfy the Golden Ratio, which is $\frac{W}{l} = \frac{1}{l+w}$ if the length of the frame is 24 inches, which is $\frac{W}{l} = \frac{1}{l+w}$ if the length of the frame is 24 inches, which is the width of the frame? About 14.83 in. 14. Team A can wash all the windows in the school in x hours. It takes Team B S hours. How long does it take Team B to do the job alone?	8-5 Solving Rational Equations and Inequalities To solve a rational equation, clear any denominators by multiplying each term on both sides of the equation by the least common denominator, LCD. Solve: $x + \frac{12}{x} = 7$. Step 1 The LCD is x. Multiply each term by x. $x(x) + \frac{12}{x}(x) = 7(x)$ This makes the equation a quadratic equation. Step 2 Simplify. $x^2 + 12 = 7x$ Step 3 Write in standard form. $x^2 - 7x + 12 = 0$ Step 4 Factor the quadratic equation. (x - 3)(x - 4) = 0 Step 5 Set each factor equal to 0. x - 3 = 0 x - 4 = 0 Step 6 Solve each equation. x = 3 x = 4 $3 + \frac{12}{3} = 3 + 4 = 7\sqrt{4} + \frac{12}{4} = 4 + 3 = 7\sqrt{4}$ Solve each equation. $1. \frac{x}{2} + 1 = \frac{4}{x}$ $2. x - \frac{6}{x} = 1$ $3. x = 4 + \frac{5}{x}$ $\frac{x(x) = 4(x) + \frac{5}{x}}{x^2 + 2x - 8}$ $\frac{x^2 - 6 = x}{(x - 4)(x - 2) = 0}$ $\frac{x^2 - x - 6 = 0}{(x - 3)(x + 2) = 0}$ $\frac{x^2 - 4x - 5 = 0}{(x - 5)(x + 1) = 0}$