

LESSON

8-5

Practice A**Solving Rational Equations and Inequalities**

Find the least common denominator (LCD) for each pair.

1. x and $\frac{3}{x}$

2. $\frac{3}{x-6}$ and $\frac{x}{4}$

3. x^2 and x^3

Solve each equation.

4. $2 + \frac{1}{x} = 4$

5. $\frac{12}{x} + 4 = 3$

6. $x + 2 = \frac{3}{x}$

7. $\frac{5}{6} + \frac{4}{x} = 3$

Solve each inequality.

8. $\frac{8}{x+2} < 2$

9. $\frac{10}{x-5} \geq 2$

10. $\frac{3}{x-1} < 3$

11. $\frac{6}{x+4} > 2$

Solve.

12. List all of the extraneous solutions for the equation $\frac{2x}{x+4} = \frac{x}{x-1}$.

13. Virat and Ari are washing the family car. When Virat washes the car by himself it takes him 3 hours, but with Ari helping it takes only 2 hours.

a. In the equation $\frac{1}{3}(2) + \frac{1}{m}(2) = 1$, what does m represent?

b. Find the value of m .

LESSON **Practice A**
8-5 Solving Rational Equations and Inequalities

Find the least common denominator (LCD) for each pair.

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

_____ x _____ $4(x-6)$ _____ x^3

Solve each equation.

4. $2 + \frac{1}{x} = 4$ 5. $\frac{12}{x} + 4 = 3$

_____ $x = \frac{1}{2}$ _____ $x = -12$

6. $x + 2 = \frac{3}{x}$ 7. $\frac{5}{6} + \frac{4}{x} = 3$

_____ $x = -3, x = 1$ _____ $x = \frac{24}{13}$

Solve each inequality.

8. $\frac{8}{x+2} < 2$ 9. $\frac{10}{x-5} \geq 2$

_____ $x < -2$ or $x > 2$ _____ $5 < x \leq 10$

10. $\frac{3}{x-1} < 3$ 11. $\frac{6}{x+4} > 2$

_____ $x < 1$ or $x > 2$ _____ $-4 < x \leq -1$

Solve.

12. List all of the extraneous solutions for the equation $\frac{2x}{x+4} = \frac{x}{x-1}$.

_____ $x = -4$ and 1 because they make the denominators of the original equation equal to 0

13. Virat and Ari are washing the family car. When Virat washes the car by himself it takes him 3 hours, but with Ari helping it takes only 2 hours.

a. In the equation $\frac{1}{3}(2) + \frac{1}{m}(2) = 1$, what does m represent?

_____ **The length of time it would take Ari to wash the car himself**

b. Find the value of m .

_____ $m = 6$

LESSON **Practice B**
8-5 Solving Rational Equations and Inequalities

Solve each equation.

1. $x - \frac{6}{x} = 5$ 2. $\frac{15}{4} = \frac{6}{x} + 3$

_____ $x = -1$ or $x = 6$ _____ $x = 8$

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

_____ $x = 3$ or $x = -1$ _____ no solution.

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

5. $\frac{6}{x+1} < -3$ 6. $\frac{x}{x-2} \geq 0$

_____ $-3 < x < -1$ _____ $x \leq 0$ or $x > 2$

7. $\frac{2x}{x+5} \leq 0$ 8. $\frac{-x}{x-3} \geq 0$

_____ $-5 < x \leq 0$ _____ $0 \leq x < 3$

Solve each inequality algebraically.

9. $\frac{12}{x+4} \leq 4$ 10. $\frac{7}{x+3} < -5$

_____ $x < -4$ or $x \geq -1$ _____ $-\frac{22}{5} < x < -3$

11. $\frac{x}{x-2} > 9$ 12. $\frac{2x}{x-5} \geq 3$

_____ $2 < x < \frac{9}{4}$ _____ $5 < x \leq 15$

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?

_____ **About 45.5 miles per hour**

LESSON **Practice C**
8-5 Solving Rational Equations and Inequalities

Solve each equation.

1. $\frac{12r}{r+2} = \frac{4}{r+2} - 6$ 2. $\frac{4x}{x-4} = \frac{2x+8}{x-4}$

_____ $r = -\frac{4}{9}$ _____ no solution.

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 $x = -1$ _____ $d = \frac{1}{5}$

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

5. $\frac{x-1}{x} < 2$ 6. $\frac{3x}{x+5} \leq -4$

_____ $x < -1$ or $x > 0$ _____ $-5 < x \leq -3$

7. $\frac{2-x}{x+3} \geq 4$ 8. $\frac{x}{4-x} < 3$

_____ $-3 < x \leq -2$ _____ $x < 3$ OR $x > 4$

Solve each inequality algebraically.

9. $\frac{14}{m} \leq \frac{7}{2}$ 10. $\frac{12}{s-5} > 3$

_____ $m < 0$ or $m \geq 4$ _____ $5 < s < 9$

11. $\frac{7z}{z-4} \geq 6$ 12. $\frac{-9x}{x+12} < -5$

_____ $z \leq -24$ or $z > 4$ _____ $x < -12$ or $x > 15$

Solve.

13. An artist is designing a picture frame whose length, l , and width, w , satisfy the Golden Ratio, which is $\frac{w}{l} = \frac{l}{l+w}$. 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 the job in 8.5 hours. How long does it take Team B to do the job alone?

_____ **About 18.6 h**

LESSON **Reteach**
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.

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.

$x = 3$ $x = 4$

Always check the solutions to rational equations.

Check $x + \frac{12}{x} = 7$

$x = 3$

$x = 4$

$3 + \frac{12}{3} = 3 + 4 = 7$

$4 + \frac{12}{4} = 4 + 3 = 7$

Solve each equation.

1. $\frac{x}{2} + 1 = \frac{4}{x}$ 2. $x - \frac{6}{x} = 1$ 3. $x = 4 + \frac{5}{x}$

_____ $\frac{x}{2}(2x) + 1(2x) = \frac{4}{x}(2x)$ _____ $x(x) - \frac{6}{x}(x) = 1(x)$ _____ $x(x) = 4(x) + \frac{5}{x}x$

_____ $x^2 + 2x = 8$ _____ $x^2 - 6 = x$ _____ $x^2 = 4x + 5$

_____ $x^2 + 2x - 8 = 0$ _____ $x^2 - x - 6 = 0$ _____ $x^2 - 4x - 5 = 0$

_____ $(x+4)(x-2) = 0$ _____ $(x-3)(x+2) = 0$ _____ $(x-5)(x+1) = 0$

_____ $x = -4, x = 2$ _____ $x = 3, x = -2$ _____ $x = 5, x = -1$