10.1.3 How can I solve it?

Solving by Rewriting

Lessons 10.1.1 and 10.1.2 focused on how to multiply, divide, and simplify rational expressions. How can you use these skills to solve problems?

10-24. Review what you learned in Lessons 10.1.1 and 10.1.2 by multiplying or dividing the expressions below. Simplify your results.

a. $\frac{x-7}{9(2x-1)} \div \frac{(x+5)(x-7)}{6x(x+5)}$

b. $\frac{6x^2-x-1}{3x^2+25x+8} \cdot \frac{x^2+4x-32}{2x^2+7x-4}$

10-25. Cassie wants to solve the quadratic equation $x^2+1.5x-2.5=0$. "I think I need to use the Quadratic Formula because of the decimals," she told Claudia. Suddenly, Claudia blurted out, "No, Cassie! I think there is another way. Can't you first rewrite this equation so it has no decimals?"

a. What is Claudia talking about? Explain what she means. Then rewrite the equation so that it has no decimals.

b. Now solve the new equation (the one without decimals). Check your solution(s).

10-26. SOLVING BY REWRITING

Rewriting $x^2+1.5x-2.5=0$ in problem 10-25 gave you a new, **equivalent** equation that was much easier to solve. If needed, refer to the Math Notes box for this lesson for more information about equivalent equations.

How can each equation below be rewritten so that it is easier to solve? With your team, find an equivalent equation for each equation below. Be sure your equivalent equation has no fractions or decimals and has numbers that are reasonably small. Strive to find the *simplest* equation. Then solve the new equation and check your answer(s).

a. $32(3x)-32(5)=32(7)$

b. $9000x^2-6000x-15000=0$

c. $\frac{1}{3}+\frac{x}{3}=\frac{10}{3}$

d. $2x^2+4x-2.5=0$

10-27. Examine the equation below.

$$\frac{x}{6} - \frac{5}{8} = 4$$

a. Multiply each term by 6. What happened? Do any fractions remain?

b. If you have not already done so, decide how you can change your result from part (a) so that no fractions remain. Then solve the resulting equation.

c. Multiplying $\frac{x}{6} - \frac{5}{8} = 4$ by 6 did not eliminate all the fractions. What could you have multiplied by to get rid of all the fractions? Explain how you got your answer and write the equivalent equation that has no fractions.

d. Solve the resulting equation from part (c) and check your solution in the original equation.

10-28. Now you are going to **reverse** the process. Your teacher will give your team a simple equation that you need to "complicate." Change the equation to make it seem harder (although you know it is still equivalent to the easy equation).

a. Verify that your new equation is equivalent to the one assigned by your teacher.

b. Share your new equation with the class by posting it on the overhead projector or chalkboard.

c. Copy down the equations generated by your class on another piece of paper. You will need these equations for homework problem 10-29.

METHODS AND MEANINGS

MATH NOTES

Equivalent Equations

Two equations are **equivalent** if they have all the same solutions. There are many ways to change one equation into a different, equivalent equation. Common ways include: *adding* the same number to both sides, *subtracting* the same number from both sides, *multiplying* both sides by the same number, *dividing* both sides by the same (non-zero) number, and *rewriting* one or both sides of the equation.

For example, the equations below are all equivalent to $2x+1=3$:

$20x+10=30$	$2(x+0.5)=3$
$\frac{2x}{3}+\frac{1}{3}=1$	$0.002x+0.001=0.003$

Review & Preview

10-29. Solve the equations generated by your class in problem 10-28. Be sure to check each solution and show all work.

10-30. Multiply or divide the expressions below. Leave your answers as simplified as possible.

a. $\frac{(3x-1)(x+7)}{4(2x-5)} \cdot \frac{10(2x-5)}{(4x+1)(x+7)}$

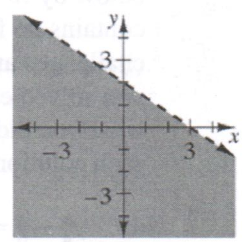
b. $\frac{(m-3)(m+11)}{(2m+5)(m-3)} \div \frac{(4m-3)(m+11)}{(4m-3)(2m+5)}$

c. $\frac{2p^2+5p-12}{2p^2-5p+3} \cdot \frac{p^2+8p-9}{3p^2+10p-8}$

d. $\frac{4x-12}{x^2+3x-10} \div \frac{2x^2-13x+21}{2x^2+3x-35}$

10-31. Find the equation of the line parallel to $y = -\frac{1}{3}x + 5$ that goes through the point (9, –1).

10-32. Write the inequality represented by the graph at right.



10-33. Jessica has three fewer candies than twice the number Dante has.

a. If Dante has *d* candies, write an expression to represent how many candies Jessica has.

b. If Jessica has 19 candies, write and solve an equation to find out how many candies Dante has.