Name _____   Date _____   Class Period _____

Algebra 1 Game

3.3 Exploring Multi-Step Equations

MATERIALS • paper and pencil

HOW TO PLAY

- Form a group of four students.
- There is no talking in this game.
- One person in the group will be handed a piece of paper with an equation printed on the top. Perform one step in solving the equation, then pass the paper to the next person in the group.
- The student receiving the paper must review the work already performed, make corrections if necessary. Then perform the next step in solving the equation and pass the paper to a third member of the group.
- Each person receiving the paper must first check the work done by prior group members and then perform an additional step.
- The person holding the paper when the equation is completely solved brings the paper to the front of the room. When all groups have finished the final solvers write the solution on the board.
- The starting position rotates with each new equation.

PRACTICE

In Exercises 1–9, solve the equation.

1. $-3 = 5 - 3a + 4$

2. $10x - 4x - 5 = 25$

3. $15 = 8t + (-3t)$

4. $4a - 2(a - 3) = 16$

5. $17 = 3(y + 1) - 4y$

6. $\dfrac{3}{4}(16x - 4) = 21$

7. $\dfrac{2}{5}(x - 3) - 2 = 6$

8. $3(x - 2) + 1 = -4$

9. $3(x - 8) + 2x = -22$

1. $2x - 9 = -11$

2. $20 = -8 + 5y - 2$

3. $-4(a + 6) = 12$

4. $9 = 4t + (-7t)$

5. $-3(2y - 4) - 6 = 30$

6. $m + 4(m + 3) = 17$

7. $8x - (8 + 6x) = 20$

8. $\frac{2}{3}(x - 4) + 2 = 8$

ANSWER KEY

HOW TO PLAY

1. $x = -1$ 2. $y = 6$

3. $a = -9$ 4. $t = -3$

5. $y = -4$ 6. $m = 1$

7. $x = 14$ 8. $x = 13$

PRACTICE

1. $a = 4$ 2. $x = 5$ 3. $t = 3$

4. $a = 5$ 5. $y = -14$ 6. $x = 2$

7. $x = 23$ 8. $x = \dfrac{1}{3}$ 9. $x = \dfrac{2}{5}$

Teacher Notes

ACTIVITY PREPARATION AND MATERIALS

- It may be helpful to have each member of a group write in a different color. This way you can be sure every one is contributing and will emphasize the different steps in solving the equation.
- You will need enough copies of the equations so that each group receives each equation. Cut paper into quarters so that one equation may be passed out at a time.
- Decide how to divide students into groups. Four students per group is recommended, but three will also work.
- Decide whether you want to keep score. If you do, decide whether you will keep track of the score or assign a student to do so. Also decide whether you will keep score on paper or on the board.

ACTIVITY MANAGEMENT

- Some equations may require fewer than 4 steps, so not every student is involved in every solution. Some may require more than 4 steps, so one or more students may have to work on two steps of the solution.
- In this practice activity students will solve multi-step equations in round-robin fashion *without any talking*. Students are seated in groups, or in a row. A person in the group (row) is handed a quarter sheet of paper with an equation printed at the top. That student performs one step in solving the equation and then passes the paper to the next person in the group.
- The student receiving the paper reviews the work already performed, makes a correction if necessary, and then performs the second step in solving the equation. The paper is then passed on to the third person.
- Each person receiving the paper must first check the work done by prior group members, and then they perform an additional step. The last person holding the paper when the equation is completely solved, brings the paper to the front of the room. When all groups have finished, the final solvers write the solution on the board. If you wish to keep score, groups with the correct solution get a point.
- Do not start with the same person each time. Rotate the starting position with each new equation. In the simpler equations, the order in which the students perform the operations will generally be the same. With more complex equations, differences will likely occur. If two groups use different solution steps to reach the same correct solution, take advantage of the opportunity to show how there may be more than one way to solve an equation. Students may be able to provide ideas on whether one method is easier, more efficient or more generally applicable than another.
- **A-Level Alternative** For additional two step equations, you could include equations from the Skill Practice or Extra Practice for Lesson 3.2
- **C-Level Alternative** Choose harder equations with more steps to solve or with solutions that are not integers. The last three problems of the Practice section are slightly harder and may only be appropriate for students with a solid understanding of how to solve multi-step equations.

Activity and Closure Questions

Ask these questions as a class.

1. What were some common mistakes that you and your classmates made in solving multi-step equations? How can you avoid making these mistakes in the future?

   Answer: Answers may vary.

2. How important was it that each member of your group showed their work clearly? Why is it important to show all of your steps in solving an equation?

   Answer: Answers may vary.

LESSON TRANSITION

This activity provides students extra practice in solving multi-step equations. The round-robin will help students who are struggling to see how their peers start to solve a problem and more advanced students will still benefit as they must check the work of the previous steps. This activity provides a good opportunity to talk about different ways to solve equations as groups come up with the same solution, but a different process. By reviewing the solutions of Exercises 2, 4, and 6, you will have covered the material demonstrated in Examples 1, 2, and 4 respectively.