LESSON MAKER PRO

Solve It Sideways

Use inverse operations with numbers and letter coefficients.

GRADE 8 · 8.PAR.3.5

8.PAR.3.5 "Solve linear equations and inequalities in one variable with coefficients represented by letters and explain the solution based on the contextual, mathematical situation."

NAME _____ DATE _____

KEEP X ALONE

Undo operations in reverse order until x is alone. When you divide an inequality by a negative number, reverse the inequality sign. A letter coefficient must be nonzero before you divide by it.

WORKED EXAMPLE

Solve 8x - 14 = 50.

1. Add 14 to both sides: 8x = 64.
2. Divide both sides by 8: x = 8.

Answer: x = 8

PRACTICE 6 problems

1 Solve ax + 5 = 29 for x. Assume a != 0.

ANSWER _____

2 Solve 3x - b = 21 for x.

ANSWER _____

3 Solve cx + 12 = 0 for x. Assume c != 0.

ANSWER _____

4 Given d > 0, solve dx - 11 <= 25.

ANSWER _____

5 Given n < 0, solve nx + 19 > 4.

ANSWER _____

6 Solve 2(x + 9) - 6 = 30.

ANSWER _____

APPLY IT Show your work

1 A coding club charges a $7 sign-up fee and x dollars for each workshop. Maya pays $43 for 4 workshops. Find x and state what it means in this situation.

WORK SPACE

ANSWER _____

2 Priya has no more than 33 minutes to work on an art contest poster. Setting up supplies takes 5 minutes, and each design revision takes 4 minutes. Let x be the number of revisions. What is the greatest whole number of revisions Priya can make?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve ax + 10 <= 34 for x for all possible values of a. Explain what happens when a = 0.

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ANSWER KEY

Solve It Sideways

GRADE 8 · 8.PAR.3.5

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve ax + 5 = 29 for x. Assume a != 0.	**x = 24/a**
2	Solve 3x - b = 21 for x.	**x = (b + 21)/3**
3	Solve cx + 12 = 0 for x. Assume c != 0.	**x = -12/c**
4	Given d > 0, solve dx - 11 <= 25.	**x <= 36/d**
5	Given n < 0, solve nx + 19 > 4.	**x < -15/n**
6	Solve 2(x + 9) - 6 = 30.	**x = 9**

PART 2 · APPLY IT

1. **x = 9. Each workshop costs $9.** Write 4x + 7 = 43. Subtract 7, then divide by 4 to get x = 9.
2. **Priya can make at most 7 revisions.** Write 4x + 5 <= 33. Subtract 5 and divide by 4 to get x <= 7, so the greatest whole number is 7.

CHALLENGE

If a > 0, x <= 24/a. If a < 0, x >= 24/a. If a = 0, every value of x is a solution because 10 <= 34 is always true.

Accept equivalent algebraic forms, such as x = (29 - 5)/a. Require students to reverse the inequality when dividing by a negative coefficient and to include the stated nonzero conditions.