LESSON MAKER PRO

Distance Has Two Sides

Solve absolute value equations and check what the answers mean.

HIGH SCHOOL · A1.A.1.2

A1.A.1.2 "Solve absolute value equations and interpret the solutions in the original context."

NAME _____ DATE _____

TWO POSSIBLE VALUES

Absolute value measures distance from zero. When an absolute value equals a positive number, the expression inside can equal that number or its opposite. Isolate the absolute value, solve both cases, and check whether each answer makes sense in context.

WORKED EXAMPLE

Solve $|5x - 11| = 24$.

1. $5x - 11 = 24$ or $5x - 11 = -24$
2. $5x = 35$ or $5x = -13$
3. $x = 7$ or $x = -13/5$

Answer: x = 7 or x = -13/5

PRACTICE 6 problems

1 Solve $|x - 20| = 6$. Give all solutions.

ANSWER _____

2 Solve $|2x + 1| = 17$. Give all solutions.

ANSWER _____

3 Solve $|x + 18| = 0$.

ANSWER _____

4 Solve $3|x - 12| + 2 = 29$. Give all solutions.

ANSWER _____

5 Solve $|6x - 2| = 10$. Give all solutions.

ANSWER _____

6 Solve $|2x + 16| = -1$.

ANSWER _____

APPLY IT Show your work

1 A sneaker auction is predicted to end at $40. The actual final bid, x dollars, is $12 away from the prediction. Write an absolute value equation and find both possible final bids.

WORK SPACE

ANSWER _____

2 Your school club expects to sell 16 hoodies online. The actual number sold, x, differs from the estimate by 20 hoodies. Write an absolute value equation and find the possible number sold.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve 2|x - 28| + 1 = 17. Then explain which solution fits if x is the number of students at a school event and at least 30 students attended.

WORK SPACE AND ANSWER

ANSWER KEY

Distance Has Two Sides

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve |x - 20| = 6. Give all solutions.	**x = 14 or x = 26**
2	Solve |2x + 1| = 17. Give all solutions.	**x = 8 or x = -9**
3	Solve |x + 18| = 0.	**x = -18**
4	Solve 3|x - 12| + 2 = 29. Give all solutions.	**x = 3 or x = 21**
5	Solve |6x - 2| = 10. Give all solutions.	**x = 2 or x = -4/3**
6	Solve |2x + 16| = -1.	**No solution**

PART 2 · APPLY IT

1. **|x - 40| = 12; the final bid could be $28 or $52.** The distance between the final bid and $40 is $12. Solve x - 40 = 12 and x - 40 = -12.
2. **|x - 16| = 20; the club sold 36 hoodies. The other solution, -4, cannot be a number of hoodies sold.** Solving x - 16 = 20 or x - 16 = -20 gives 36 or -4. Reject -4 because a sale count cannot be negative.

CHALLENGE

The equation gives x = 20 or x = 36. Only 36 fits because 20 is less than 30.

Accept solutions in either order. For the hoodie problem, require students to reject the negative solution using the context.