LESSON MAKER PRO

Equation Pathways

Use inverse operations to solve real situations.

GRADE 7 · 7.EE.B.4a

CCSS.Math.Content.7.EE.B.4a "Solve word problems leading to equations of the form px + q = r and p (x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution..."

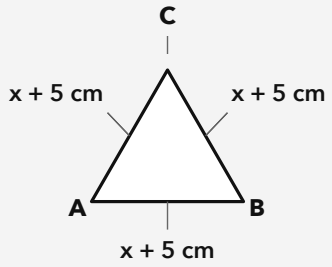
NAME _____ DATE _____

UNDO OPERATIONS

For px + q = r, undo q first, then undo multiplication by p. For p(x + q) = r, divide by p first, then undo q, and check by replacing x in the original equation.

WORKED EXAMPLE

The equilateral triangle shown has a perimeter of 36 cm. Find x.

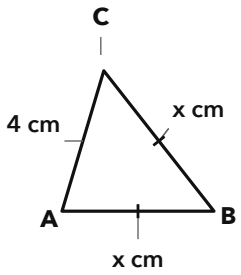


1. Write the perimeter equation: 3(x + 5) = 36.
2. Divide both sides by 3: x + 5 = 12.
3. Subtract 5 from both sides: x = 7.

Answer: x = 7 cm

PRACTICE 6 problems

1 The triangle shown has a perimeter of 28 cm. Find x.



ANSWER _____

2 Solve: -6x + 1 = -23

ANSWER _____

3 Solve: (1/2)x - 4 = 6

ANSWER _____

4 Solve: 9(x - 1) = 72

ANSWER _____

5 Solve: -4(x + 2) = 24

ANSWER _____

6 Solve: (2/9)(x + 4) = 10

ANSWER _____

APPLY IT Show your work

1 Use the receipt table. Jay paid $30 for x months of a game pass. Write and solve an equation. Then state the arithmetic steps you could use without an equation.

GAME PASS RECEIPT

Item	Cost
Monthly game pass	$4 per month
One-time activation fee	$6
Total paid	$30

ANSWER _____

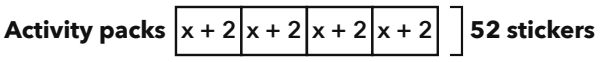
2 Four friends on a robotics team buy matching team badges. Each badge costs x dollars. A $12 shipping fee is added once, and the total is $64. What is the cost of each badge?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The tape model shows 4 identical activity packs. Each pack has x stickers plus 2 bonus stickers, for a total of 52 stickers. Find x. In one or two sentences, compare the algebraic and arithmetic solution sequences.



WORK SPACE AND ANSWER

ANSWER KEY

Equation Pathways

GRADE 7 · 7.EE.B.4a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The triangle shown has a perimeter of 28 cm. Find x.	**x = 12 cm**
2	Solve: -6x + 1 = -23	**x = 4**
3	Solve: (1/2)x - 4 = 6	**x = 20**
4	Solve: 9(x - 1) = 72	**x = 9**
5	Solve: -4(x + 2) = 24	**x = -8**
6	Solve: (2/9)(x + 4) = 10	**x = 41**

PART 2 · APPLY IT

1. **x = 6 months. Arithmetic steps: subtract $6, then divide by $4.** Use 4x + 6 = 30. Subtract 6 to get 4x = 24, then divide by 4.
2. **x = $13** Use 4x + 12 = 64. Subtract 12, then divide 52 by 4.

CHALLENGE

x = 11 stickers. Algebra divides both sides by 4 and then subtracts 2, while arithmetic uses the same divide-then-subtract sequence with quantities.

Accept equivalent equations and correct inverse-operation work. Require units for the perimeter, months, stickers, and money answers.