LESSON MAKER PRO

Costs and Cutoffs

Model costs and find the values that fit.

GRADE 8 · PA.A.4

PA.A.4 "Represent and solve problems using mathematical models and situations with equations and inequalities involving linear expressions. Solve mathematical problems using linear equations with one variable where there could be one..."

NAME _____ DATE _____

THE BIG IDEA

A cost with a fixed fee and a charge for each item can be written as rate times x plus fee. Solve an inequality like an equation, but reverse the inequality sign when you divide by a negative number.

WORKED EXAMPLE

The table shows the cost of renting a bike for x hours. For what values of x is the cost under $33?

BIKE RENTAL

Hours (x)	Cost ($)
0	8
2	18

1. Hourly rate: (18 - 8) / 2 = 5
2. Cost: 5x + 8
3. Solve: 5x + 8 < 33
4. 5x < 25, so x < 5

Answer: x < 5 hours

PRACTICE 4 problems

1 Solve: 4x + 3 > 15.

ANSWER _____

2 Solve: -2x + 9 < 1.

ANSWER _____

3 Solve: x/2 - 2 < 4.

ANSWER _____

4 Solve: 6 - 3x > 0.

ANSWER _____

APPLY IT Show your work

1 The table shows the cost of renting microphones for x hours. Write an inequality and find the whole numbers of hours that cost less than $45.

MICROPHONE RENTAL

Hours (x)	Cost ($)
0	9
2	21

ANSWER _____

2 The table shows the total cost of ordering x sticker packs. Write an inequality and find the positive whole numbers of packs that cost less than $40.

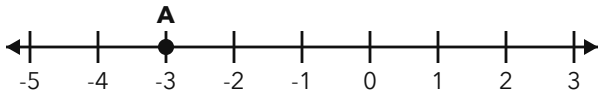
STICKER ORDER

Packs (x)	Cost ($)
1	13
2	22

ANSWER _____

CHALLENGE One step up

Solve -3x + 4 > 10. Describe its graph on the number line, then explain whether point A is a solution.



WORK SPACE AND ANSWER

Costs and Cutoffs

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve: 4x + 3 > 15.	**x > 3**
2	Solve: -2x + 9 < 1.	**x > 4**
3	Solve: x/2 - 2 < 4.	**x < 12**
4	Solve: 6 - 3x > 0.	**x < 2**

PART 2 · APPLY IT

1. **6x + 9 < 45; x < 6; 0, 1, 2, 3, 4, or 5 hours** The cost rises $12 in 2 hours, so the hourly rate is $6 and the fixed fee is $9. Solving 6x + 9 < 45 gives x < 6.
2. **9x + 4 < 40; x < 4; 1, 2, or 3 packs** Each added pack costs $9, leaving a $4 fixed fee. Solving 9x + 4 < 40 gives x < 4, so the positive whole-number choices are 1, 2, and 3.

CHALLENGE

x < -2. Put an open circle at -2 and shade left. A is a solution because -3 < -2.

Accept equivalent inequality forms. For the rental, include 0 hours; for the sticker order, use positive whole numbers only.