LESSON MAKER PRO

Balance Equation Quest

Use balance thinking to solve multistep equations.

GRADE 8 · 8.PFA.4.a

8.PFA.4.a "Represent and solve multistep linear equations in one variable with the variable on one or both sides of the equation (up to four steps) using a variety of concrete materials and pictorial representations."

NAME _____ DATE _____

KEEP BOTH SIDES EQUAL

Treat an equation like a balanced scale. Whatever you add, subtract, multiply, or divide on one side, do the same to the other side. A sketch of matching boxes can show equal groups before you write each algebra step.

WORKED EXAMPLE

Balance sketch: [x + 4] [x + 4] [x + 4] = [x] [x] [17]. Solve 3(x + 4) = 2x + 17.

1. Expand the left side: 3x + 12 = 2x + 17.
2. Remove 2x from both sides: x + 12 = 17.
3. Remove 12 from both sides: x = 5.

Answer: x = 5

PRACTICE 6 problems

1 Solve: 6x + 9 = 45

ANSWER _____

2 Solve: 8x + 1 = 6x + 15

ANSWER _____

3 Solve: 9(x + 1) = 7x + 21

ANSWER _____

4 Solve: 11x - 8 = 9x + 18

ANSWER _____

5 Solve: 7(x - 8) = x + 16

ANSWER _____

6 Solve: 12x - 9 = 8x + 23

ANSWER _____

APPLY IT Show your work

1 A music club charges $7 each month plus a $9 sign-up fee. Jordan paid $51 in all. For how many months did Jordan belong to the club?

WORK SPACE

ANSWER _____

2 Maya saves $11 each week and already has $18. Leo saves $7 each week and already has $42. After how many weeks will they have the same amount saved?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve: x/6 + 8 = x/9 + 15

_____

_____

ANSWER KEY

Balance Equation Quest

GRADE 8 · 8.PFA.4.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve: 6x + 9 = 45	**x = 6**
2	Solve: 8x + 1 = 6x + 15	**x = 7**
3	Solve: 9(x + 1) = 7x + 21	**x = 6**
4	Solve: 11x - 8 = 9x + 18	**x = 13**
5	Solve: 7(x - 8) = x + 16	**x = 12**
6	Solve: 12x - 9 = 8x + 23	**x = 8**

PART 2 · APPLY IT

1. **6 months** Write 7m + 9 = 51. Subtract 9, then divide by 7 to get m = 6.
2. **6 weeks** Write 11w + 18 = 7w + 42. Subtract 7w and 18, then divide by 4 to get w = 6.

CHALLENGE

x = 126

Accept any algebraic steps or valid balance-model sketch that keeps both sides equal. For word problems, accept the numerical answer when the correct unit is clear.