

# Balance Both Sides

*Use equivalent steps to solve linear equations.*

**HIGH SCHOOL • HSA-REI.A**

**CCSS.Math.Content.HSA-REI.A** "Understand solving equations as a process of reasoning and explain the reasoning"

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## KEEP THE EQUATION BALANCED

An equation states that two expressions have the same value. Use the same inverse operation on both sides to create an equivalent equation, then isolate  $x$ . Check your result by substituting it into the original equation.

## WORKED EXAMPLE

Solve:  $7x - 5 = 30$

1. Add 5 to both sides:  $7x = 35$ .
2. Divide both sides by 7:  $x = 5$ .
3. Check:  $7(5) - 5 = 30$ .

**Answer:  $x = 5$**

## PRACTICE 6 problems

**1** Solve:  $3x + 8 = 26$

**ANSWER** \_\_\_\_\_

**2** Solve:  $4(x - 1) = 36$

**ANSWER** \_\_\_\_\_

**3** Solve:  $2(x + 9) = 24$

**ANSWER** \_\_\_\_\_

**4** Solve:  $x/4 + 3 = 9$

**ANSWER** \_\_\_\_\_

**5** Solve:  $11x + 2 = 68$

**ANSWER** \_\_\_\_\_

**6** Solve:  $9 - 2x = -15$

**ANSWER** \_\_\_\_\_

## APPLY IT Show your work

- 1** A gaming account has \$18 available. After paying a \$6 account fee, the remaining money buys game credits that cost \$3 each. How many credits can be bought?

WORK SPACE

ANSWER \_\_\_\_\_

- 2** A student club pays a \$12 setup fee plus \$4 for each team shirt. The total cost is \$48. How many shirts does the club order?

WORK SPACE

ANSWER \_\_\_\_\_

## CHALLENGE One step up

### CHALLENGE

Solve:  $3(2x - 4) + 8 = 2(x + 9)$ . Then explain in one or two sentences why your steps do not change the solution.

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## PART 1 · PRACTICE

| # | PROBLEM                | ANSWER                     |
|---|------------------------|----------------------------|
| 1 | Solve: $3x + 8 = 26$   | <b><math>x = 6</math></b>  |
| 2 | Solve: $4(x - 1) = 36$ | <b><math>x = 10</math></b> |
| 3 | Solve: $2(x + 9) = 24$ | <b><math>x = 3</math></b>  |
| 4 | Solve: $x/4 + 3 = 9$   | <b><math>x = 24</math></b> |
| 5 | Solve: $11x + 2 = 68$  | <b><math>x = 6</math></b>  |
| 6 | Solve: $9 - 2x = -15$  | <b><math>x = 12</math></b> |

## PART 2 · APPLY IT

- 4 credits** Let  $x$  be the number of credits. Solve  $3x + 6 = 18$  to get  $x = 4$ .
- 9 shirts** Let  $x$  be the number of shirts. Solve  $4x + 12 = 48$  to get  $x = 9$ .

## CHALLENGE

**$x = 11/2$ . I distributed and combined like terms, then used the same inverse operations on both sides, which kept the equation balanced.**

Accept any correctly shown sequence of equivalent equations. For the challenge, accept  $11/2$  or  $5.5$  and an explanation that equal operations on both sides preserve equality.