Lesson 8-1 · Session 1

# Equations and Solutions

Name _____ Date _____ Period _____

Maryland Standard 6.AT.8 · Learning target — I can check whether a value is a solution of an equation by substituting it.

Show a model, calculation, or explanation. Answer every part and label units when needed.

Exercises 1–12 earn 1 point for a correct response and 1 for supporting work. Spiral Review and Test Practice earn 1 point each.

## Learn from a model

**REMEMBER**

- An equation is a math sentence that says two expressions are equal.
- A solution is the value of the variable that makes the equation TRUE.
- Watch out — a value that works on one side but not the other is not a solution.
- Check it — write out both sides after substituting so the comparison is visible.

**WORKED EXAMPLE**

Checking a Solution by Substituting Jade wrote the equation m + 23 = 41 for a number puzzle. Is m = 18 a solution?

**Step 1** Substitute: replace m with 18. The equation becomes 18 + 23 = 41.

**Step 2** Do the arithmetic on the left side: 18 + 23 makes 41.

**Step 3** Compare the two sides: 41 and 41. Both sides balance.

**Step 4** The equation is true, so m = 18 is a solution.

**Answer Yes — m = 18 makes both sides equal 41, so it is a solution.**

## Practice

**1.** Is x = 4 a solution to the equation x + 5 = 9? Check by substituting. _____

Answer _____

SHOW YOUR THINKING

**2.** Is x = 6 a solution to the equation 3x = 20? Check by substituting.

Answer _____

SHOW YOUR THINKING

**3.** Find a value of x that makes x − 3 = 7 true. _____

Answer _____

SHOW YOUR THINKING

**4.** Substitute the given value. Write True if the equation is true or False if it is not.

a. $y + 9 = 21$ when $y = 12$ _____
b. $4m = 32$ when $m = 7$ _____
c. $n - 6 = 15$ when $n = 21$ _____
d. $h \div 3 = 8$ when $h = 27$ _____
e. $7 + w = 19$ when $w = 12$ _____

Answer _____

SHOW YOUR THINKING

**5.** Snack Line. Ms. Ferrell wrote $n + 13 = 40$ for the students in the snack line after 13 more students joined. Is $n = 27$ a solution? Substitute to check.

Answer _____

SHOW YOUR THINKING

**6.** Beads Left. Camila used 22 beads from a jar and had 38 beads left, so she wrote $b - 22 = 38$. Is $b = 50$ a solution? Show your check.

Answer _____

SHOW YOUR THINKING

**7.** Van Trips. A school van makes 8 equal trips and carries 96 students in all. Malachi wrote $8v = 96$ for the students on one trip. Find the value of $v$ that makes the equation true, then prove it.

Answer _____

SHOW YOUR THINKING

**8. Devonte checked whether x = 15 is a solution of x + 25 = 45. He wrote 15 + 25 = 40 and then said it was close enough, so 15 is a solution. Explain why Devonte is wrong, then find the value of x that really is a solution.**
**Sentence Frame: "I know this because..."**

Answer _____

EXPLAIN WITH MATHEMATICAL EVIDENCE

**9.** Is p = 12 a solution of p − 5 = 7? Show your check.

Answer _____ your answer and check

SHOW YOUR THINKING

**10.** Is w = 4 a solution of 6w = 28? Show your check.

Answer _____ your answer and check

SHOW YOUR THINKING

**11.** Which Value? Which of 6, 8, or 10 is the solution of 3n = 24?

Answer _____ the solution

SHOW YOUR THINKING

**12.** Find the Mistake. Kai says x = 9 solves x + 6 = 14 because 9 is close to the answer. Explain the mistake.

Answer _____ the mistake and the solution

EXPLAIN WITH MATHEMATICAL EVIDENCE

## Spiral review

**13.** From Lesson 7-6 Session 1. Find the distance from (3, 4) to (3, −6).

Answer _____

SHOW YOUR THINKING

**14.** From Lesson 6-7 Session 1. Find the GCF of 28 and 42.

Answer _____

SHOW YOUR THINKING

**15.** From Lesson 4-4 Session 1. Find 50% of 340.

Answer _____

SHOW YOUR THINKING

## Test practice

**16.** Is n = 7 a solution of n + 8 = 15?

- □ A. only if n = 8
- □ B. no
- □ C. yes
- □ D. cannot tell

**17.** Is m = 5 a solution of 4m = 24?

- □ A. cannot tell
- □ B. yes
- □ C. only if m = 4
- □ D. no

**18.** Substituting means replacing the variable with a —

| | |
|---|---|
| □ A. value | □ B. letter |
| □ C. sign | □ D. graph |

## Check and revise

| CHECK YOUR MATHEMATICS | HOW DID IT GO? |
|---|---|
| Keep both sides equal and check in the original equation.<br>Every part answered / Work shown / Units labeled when needed | I can do this:<br>Independently / With a hint / With help<br>Question to revisit: _____ |

One correction or question I want to discuss: _____

Test one proposed solution in the original equation or inequality. Show whether the statement is true.