

Introduction to Equations and Solutions

Algebra 1 • Section 1.4

Name: _____

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Quick Review and Helpful Hints

Algebra becomes easier when every symbol has a job. Read the operation first, keep signs attached to their terms, and check that each step still means the same thing as the original expression.

▷ **Example:** Simplify $2(x + 6) + 3x$.

Work: Distribute first: $2(x + 6) = 2x + 12$. Then combine like terms: $2x + 12 + 3x = 5x + 12$.

★ **Answer:** $5x + 12$

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Is $x = 6$ a solution of $x + 9 = 15$? _____

6. Is $m = 8$ a solution of $\frac{m}{2} + 3 = 6$? _____

2. Is $a = 4$ a solution of $3a - 2 = 14$? _____

7. Write an equation: 7 less than a number is 18. _____

3. Write an equation: a number plus 11 is 27. _____

8. Write an equation: half a number equals 13. _____

4. Write an equation: four times a number is 52. _____

9. Is $r = 5$ a solution of $2r + 4 = r + 9$? _____

5. Is $y = 3$ a solution of $5(y + 1) = 20$? _____

10. Write an equation: the total of x and $x + 4$ is 30. _____

◆ Word Problems

11. A streaming plan costs \$9 plus \$2 per movie. Write an equation for a \$23 bill. _____

12. Sam says $x = 4$ solves $6x - 5 = 20$. Is Sam correct? _____



Answer Keys

- | | |
|------------------|------------------------|
| 1. Yes | 7. $n - 7 = 18$ |
| 2. No | 8. $\frac{n}{2} = 13$ |
| 3. $n + 11 = 27$ | 9. Yes |
| 4. $4n = 52$ | 10. $x + (x + 4) = 30$ |
| 5. Yes | 11. $9 + 2m = 23$ |
| 6. No | 12. No |

Step-by-Step Explanations

- A solution is just a value that makes the equation honest. Try 6: $6 + 9$ really is 15, so yes.
- Test it by plugging in: $3(4) - 2$ comes out to 10, but we wanted 14 — so 4 doesn't fit.
- Give the mystery number a name like n . 'Plus 11' becomes +11 and 'is' is your equals sign.
- 'Four times a number' means 4 multiplied by n , and the little word 'is' quietly means equals.
- Substitute and follow the order: $3 + 1 = 4$ inside, then $5(4) = 20$. It matches, so 3 works.
- Pop in 8: half of 8 is 4, plus 3 makes 7. That's not 6, so 8 isn't the answer.
- '7 less than a number' means you start with n and take 7 away — so $n - 7$, set equal to 18.
- Half of something is that thing cut in two, which is dividing by 2. So n over 2 equals 13.
- With $r = 5$, both sides need to agree: the left gives 14 and the right also gives 14, so it checks out.
- 'Total of' is your cue to add the two expressions together, then set that sum equal to 30.
- The \$9 shows up no matter what, while $2m$ grows with each movie. Together they have to total the \$23 bill.
- Always verify a claimed solution. Here $6(4) - 5 = 19$, not 20 — and a real solution has to make both sides match exactly.



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