

Relations and Functions

Algebra 1 • Section 4.1

Name: _____

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Score: _____ / 12

Quick Review and Helpful Hints

A function pairs each input with exactly one output. Pay attention to what the input means, what rule is being applied, and whether the question asks for a value, a rule, a domain, or an interpretation.

▷ **Example:** For $f(x) = 2x + 5$, find $f(4)$.

Work: Replace x with 4: $f(4) = 2(4) + 5 = 13$.

★ **Answer:** 13

◆ Practice Problems

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

1. Is $\{(1, 4), (2, 5), (3, 6)\}$ a function? _____

6. Does $x = 5$ define y as a function of x ? _____

2. Is $\{(2, 7), (2, 9), (4, 1)\}$ a function? _____

7. Complete the pair for $y = x^2 - 1$ when $x = 4$. _____

3. Find the domain of $\{(-1, 3), (0, 5), (4, 8)\}$. _____

8. If a table has inputs 0, 1, 2 and outputs 6, 6, 6, is it a function? _____

4. Find the range of $\{(-1, 3), (0, 5), (4, 8)\}$. _____

9. Find the range of $y = 3x$ for domain $\{-2, 0, 5\}$. _____

5. Does $y = 2x + 1$ define y as a function of x ? _____

10. Which input breaks a function: $(1, 2), (3, 4), (1, 5), (6, 7)$? _____

◆ Word Problems

11. A vending machine code gives one snack for each code. Is snack a function of code? _____

12. A student's name may match several students in a school. Is student ID a function of first name? _____



Answer Keys

- | | |
|----------------------------------------------|-----------------------------------------------|
| 1. <input type="text" value="Yes"/> | 7. <input type="text" value="(4, 15)"/> |
| 2. <input type="text" value="No"/> | 8. <input type="text" value="Yes"/> |
| 3. <input type="text" value="{ -1, 0, 4 }"/> | 9. <input type="text" value="{ -6, 0, 15 }"/> |
| 4. <input type="text" value="{ 3, 5, 8 }"/> | 10. <input type="text" value="1"/> |
| 5. <input type="text" value="Yes"/> | 11. <input type="text" value="Yes"/> |
| 6. <input type="text" value="No"/> | 12. <input type="text" value="No"/> |

Step-by-Step Explanations

- Look at the inputs: 1, 2, 3 each show up once, so nobody's confused about its output.
- Poor 2 wants to be both 7 and 9 at once. An input can only pick one output.
- Domain is the input crowd, so just collect every x -coordinate you see.
- Range is what comes back out, so scoop up all the y -coordinates.
- Feed in any x , double it, add 1, and you land on exactly one answer. That's a function.
- This is a vertical line where $x = 5$ pairs with endless y 's. One input, way too many outputs.
- Drop 4 in for x : $4^2 - 1$ gives 15, so 4 travels to 15.
- Repeated outputs are totally fine. Trouble only happens when one input wants two different outputs.
- Run each input through the rule, multiplying by 3, and collect what pops out.
- Notice 1 appears twice pointing at 2 and 5. An input can't pick two outputs.
- Punch a code, get one snack, every time. One input, one output is exactly the function rule.
- Lots of kids share a first name, so that one input can't decide on a single ID.



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