Reading Function Values

Spot mistakes, reason, and work backward

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Distinguish finding an output from recovering an input. With $f(x) = 2x + 5$, evaluating $f(3)$ gives 11, while solving $f(x) = 13$ gives $x = 4$. Check a claimed value by substitution. In a finite table, an unlisted input has no specified output unless an additional rule is supplied; do not invent one.

Worked example

Example for form 2: evaluate this rule. $y = 3x + 4$ at $x = 0$.

1. Substitute the input $x = 0$, not the output: $y = 3(0) + 4$. Evaluate the product to get 0.

2. Now combine the constant: $0 + 4 = 4$. Thus the output corresponding to input 0 is 4.

Answer: $y = 4$

Practice Problems

Show your thinking.

1. Recover the input. $y = 3x + 2$, with $y = 17$. Find x.

2. Work backward through the rule. $y = -2x + 9$, with $y = 1$. Find x.

3. Find the input producing this output. $y = 4x - 3$, with $y = -11$. Find x.

4. Check this substitution. $y = 2x + 3$ at $x = -4$. A student reports 11. Correct or confirm.

5. Check the order of operations. $y = 1x^2 + 2$ at $x = -3$. A student reports -7. Correct or confirm.

6. Check whether the reported result agrees. $y = -3x + 4$ at $x = 2$. A student reports -2. Correct or confirm.

7. If $f(x) = 5x - 1$, a learner says $f(2) = 2(5 - 1) = 8$. Explain and correct.

8. The table alone defines g. Can you determine $g(3)$?

x	y
0	1
2	5
4	9

9. For $f(x) = x^2$, find all real inputs with $f(x) = 16$.

10. For $f(x) = 2x + 3$, is $f(1 + 2) = f(1) + f(2)$?

Answer Key

1. $x = 5$
2. $x = 4$
3. $x = -2$
4. $y = -5$
5. $y = 11$
6. $y = -2$
7. $f(2) = 9$
8. Not specified.
9. $x = -4$ or $x = 4$.
10. No: $9 \neq 12$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Substitute the given output: $17 = 3x + 2$. Subtract the constant to get $15 = 3x$.

2. Divide by 3: $x = 5$. Check: $3(5) + 2 = 17$, so the recovered input is 5.

Problem 2

1. Substitute the given output: $1 = -2x + 9$. Subtract the constant to get $-8 = -2x$.

2. Divide by -2: $x = 4$. Check: $-2(4) + 9 = 1$, so the recovered input is 4.

Problem 3

1. Substitute the given output: $-11 = 4x - 3$. Subtract the constant to get $-8 = 4x$.

2. Divide by 4: $x = -2$. Check: $4(-2) - 3 = -11$, so the recovered input is -2.

Problem 4

1. Substitute the input $x = -4$, not the output: $y = 2(-4) + 3$. The multiplication gives -8.

2. Then $y = -8 + 3 = -5$. Since $11 \neq -5$, the reported value is incorrect.

Problem 5

1. Substitute $x = -3$ into the rule: $y = 1(-3)^2 + 2$. The multiplication gives 9.

2. Then $y = 9 + 2 = 11$. Since $-7 \neq 11$, the reported value is incorrect.

Problem 6

1. Substitute the input $x = 2$, not the output: $y = -3(2) + 4$. The multiplication gives -6.

2. Then $y = -6 + 4 = -2$. Since $-2 = -2$, the reported value is correct.

Problem 7

1. The rule multiplies the input by 5 before subtracting 1: $f(2) = 5(2) - 1 = 10 - 1$.

2. This gives 9, not 8. Writing $2(5 - 1)$ incorrectly multiplies the constant subtraction by 2 as well.

Problem 8

1. The listed inputs are $0, 2, 4$, with outputs $1, 5, 9$. Input 3 is absent from the table.

2. Although the three pairs fit $y = 2x + 1$, no rule is stated. The finite table does not specify $g(3)$, so a value cannot be concluded.

Problem 9

1. Solve $x^2 = 16$. Both $4^2 = 16$ and $(-4)^2 = 16$, so two inputs produce this output.

2. The inputs are -4 and 4. This does not violate the function rule: each input still has exactly one output.

Problem 10

1. On the left, $f(1 + 2) = f(3) = 2(3) + 3 = 9$. On the right, $f(1) = 5$ and $f(2) = 7$.

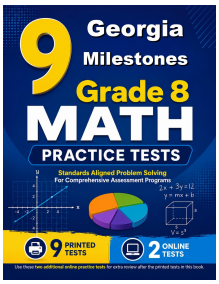
2. Then $f(1) + f(2) = 5 + 7 = 12$. Since $9 \neq 12$, the proposed equality is false for this function.

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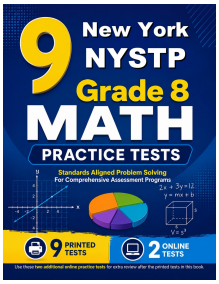
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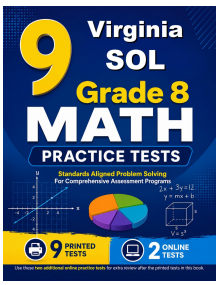
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