Reading Function Values

Apply the skill to decisions and designs

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

QUICK REVIEW

Function inputs and outputs carry units. For $C(h) = 4h + 7$, h may represent hours and C a cost in dollars. Substituting $h = 3$ gives $C(3) = 19$. To find a change, evaluate both endpoints and subtract. A stated domain limits which inputs are meaningful even when a formula can be evaluated elsewhere.

Worked example

Example for form 3: evaluate this rule. $y = 4x + 4$ at $x = 1$.

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

2. Now combine the constant: $4 + 4 = 8$. Thus the output corresponding to input 1 is 8.

Answer: $y = 8$

Practice Problems

Show your thinking.

1. A rental costs y dollars for x hours; evaluate the cost. $y = 4x + 7$ at $x = 3$.

2. A tank holds y liters after x minutes; find the amount. $y = -3x + 30$ at $x = 6$.

3. A club earns y dollars after selling x tickets; find earnings. $y = 6x - 12$ at $x = 8$.

4. A taxi uses this dollar-cost rule; find the distance x in miles. $y = 2x + 5$, with $y = 19$. Find x.

5. A plant has height $H(d) = 2d + 9$ cm. Find its growth from day 2 to day 6.

6. A theater sells only whole tickets. $R(t) = 8t$ dollars. Is input $t = 2.5$ meaningful for ticket count?

7. A route table gives minutes t and distance D in km. Find $D(4) - D(1)$.

x	y
1	3
2	5
4	9

8. Design $C(x) = ax + 5$ so $C(4) = 17$. Find a and then $C(2)$.

9. A square garden has area $A(s) = s^2$ square meters. Find the side length for area 49.

10. A cooler follows $T(h) = 18 - h$ degrees Celsius for $0 \le h \le 6$. Find $T(5)$ and state whether $h = 9$ is allowed.

Answer Key

1. $y = 19$
2. $y = 12$
3. $y = 36$
4. $x = 7$
5. 8 cm
6. No; use whole-number inputs.
7. 6 km
8. $a = 3$, $C(2) = 11$.
9. 7 m
10. 13°C; 9 is outside the domain.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Substitute the input $x = 3$, not the output: $y = 4(3) + 7$. Evaluate the product to get 12.

2. Now combine the constant: $12 + 7 = 19$. Thus the output corresponding to input 3 is 19.

Problem 2

1. Substitute the input $x = 6$, not the output: $y = -3(6) + 30$. Evaluate the product to get -18.

2. Now combine the constant: $-18 + 30 = 12$. Thus the output corresponding to input 6 is 12.

Problem 3

1. Substitute the input $x = 8$, not the output: $y = 6(8) - 12$. Evaluate the product to get 48.

2. Now combine the constant: $48 - 12 = 36$. Thus the output corresponding to input 8 is 36.

Problem 4

1. Substitute the given output: $19 = 2x + 5$. Subtract the constant to get $14 = 2x$.

2. Divide by 2: $x = 7$. Check: $2(7) + 5 = 19$, so the recovered input is 7.

Problem 5

1. At day 2, $H(2) = 2(2) + 9 = 13$ cm. At day 6, $H(6) = 2(6) + 9 = 21$ cm.

2. The growth is final minus initial height: $21 - 13 = 8$ cm. The starting height cancels when comparing these two days.

Problem 6

1. The formula would produce $R(2.5) = 8(2.5) = 20$ dollars. But 2.5 represents two and a half tickets.

2. Because only whole tickets are sold, the domain is $t = 0, 1, 2, \ldots$. The numerical substitution exists but is outside this model domain.

Problem 7

1. The row for $t = 4$ gives $D(4) = 9$ km, and the row for $t = 1$ gives $D(1) = 3$ km.

2. Subtract the readings: $9 - 3 = 6$ km. This is distance traveled between minutes 1 and 4, not total distance at minute 4.

Problem 8

1. Use the required output: $17 = 4a + 5$, so $12 = 4a$ and $a = 3$.

2. The rule is $C(x) = 3x + 5$. Thus $C(2) = 3(2) + 5 = 11$, and $C(4) = 12 + 5 = 17$ verifies the design.

Problem 9

1. Set the output equal to 49: $s^2 = 49$. The numerical square roots are $s = 7$ and $s = -7$.

2. A side length cannot be negative, so use $s = 7$ m. Check: $A(7) = 7^2 = 49$ square meters.

Problem 10

1. At $h = 5$, $T(5) = 18 - 5 = 13$ degrees Celsius. The input is allowed because $0 \le 5 \le 6$.

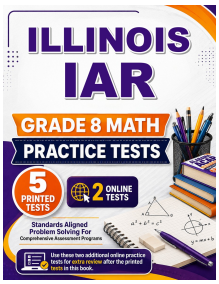
2. Although $18 - 9 = 9$ can be computed, $9 > 6$. The given model does not authorize a prediction for hour 9.

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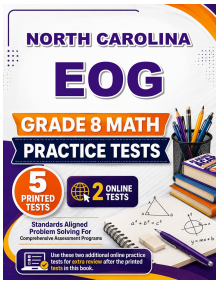
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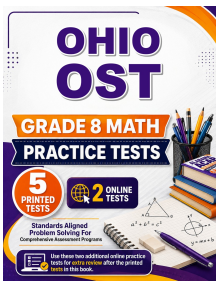
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