NudgeLearn

Grade 8 · Math

Understanding *Functions*

Answer key | 8.F.A.1 | 8.F.A.2

14 problems

1. Does the set of ordered pairs $\{(1,3),\ (2,5),\ (3,7),\ (4,9)\}$ represent a function? Explain.

   Answer **Yes**

   Each input $1, 2, 3, 4$ appears once, so every input has exactly one output. It is a function.

2. Does the set $\{(2,4),\ (3,6),\ (2,8),\ (5,10)\}$ represent a function? Explain.

   Answer **No**

   The input 2 is paired with both 4 and 8, so one input has two outputs. It is not a function.

3. Which mapping represents a function?

   Answer **B)** $1 \to a,\ 2 \to a,\ 3 \to b$

   A function allows repeated outputs but not repeated inputs. Only choice B gives each input exactly one output.

4. The function is given by $f(x) = 3x + 2$. Find $f(4)$.

   Answer 14

   $f(4) = 3(4) + 2 = 12 + 2 = 14$.

5. Using $f(x) = 3x + 2$, find $f(0)$ and $f(-1)$.

   Answer $f(0) = 2,\ f(-1) = -1$

   $f(0) = 3(0) + 2 = 2;\ \ f(-1) = 3(-1) + 2 = -3 + 2 = -1$.

6. Complete the input/output table for the function $y = 2x - 3$.

x	y
0	?
1	?
3	?
5	?

   Answer $-3,\ -1,\ 3,\ 7$

   Double each x and subtract 3: $2(0) - 3 = -3,\ 2(1) - 3 = -1,\ 2(3) - 3 = 3,\ 2(5) - 3 = 7$.

7. An input/output table is shown. Does it represent a function?

Input	Output
1	5
2	5
3	5
4	5

   Answer **Yes**

   Every input has exactly one output. Repeated outputs (5) are allowed, so it is a function.

8. For the function $g(x) = x^2 + 1$, find $g(3)$ and $g(-2)$.

   Answer $g(3) = 10,\ g(-2) = 5$

   $g(3) = 3^2 + 1 = 9 + 1 = 10;\ \ g(-2) = (-2)^2 + 1 = 4 + 1 = 5$.

9. The table shows a function. Find the output when the input is 6.

x	y
1	4
2	7
3	10
4	13

Answer 19

Each y increases by 3 and equals $3x + 1$. At $x = 6$: $3(6) + 1 = 19$.

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10. A taxi function charges $f(m) = 2m + 3$ dollars for a ride of m miles. How much does a 7-mile ride cost?

Answer $\$17$

$f(7) = 2(7) + 3 = 14 + 3 = 17$, so the ride costs $\$17$.

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11. For $f(x) = 5x - 4$, the output is $f(x) = 21$. What input x produced it?

Answer $x = 5$

Solve $5x - 4 = 21$: add 4 to get $5x = 25$, then divide by 5 to get $x = 5$.

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12. A machine follows a function: it takes a number, triples it, then subtracts 1. Write the function $f(x)$, then find the output when the input is 8.

Answer $f(x) = 3x - 1$**; output** 23

Triple then subtract 1: $f(x) = 3x - 1$. At $x = 8$: $3(8) - 1 = 24 - 1 = 23$.

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13. Maria's phone plan is a function $c(g) = 10 + 4g$, where c is the monthly cost in dollars and g is gigabytes used. Find the cost for 6 gigabytes, and find how many gigabytes give a $\$50$ bill.

Answer $\$34$ **for** 6 **GB;** 10 **GB for** $\$50$

$c(6) = 10 + 4(6) = 10 + 24 = 34$. For $\$50$: $50 = 10 + 4g$, so $4g = 40$ and $g = 10$ gigabytes.

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14. A relation pairs students with the sports they play: $(\text{Ana}, \text{soccer})$, $(\text{Ben}, \text{tennis})$, $(\text{Ana}, \text{track})$. Explain why this relation is not a function, using the words input and output.

Answer **Not a function — the input Ana has two outputs**

Treating each student as an input, Ana maps to both soccer and track. One input has two outputs, so the relation is not a function.