

Function Notation and Evaluating Functions

Name: _____ Date: _____ Score: _____ / 26

Quick Review

Function notation replaces y with $f(x)$ (read “ f of x ”). The letter names the function; the input goes in parentheses. To **evaluate** $f(a)$, substitute a for every x in the rule and simplify. To **solve** $f(x) = k$, set the rule equal to k and solve. Other letters like g , h , or p can name functions too. The notation looks scarier than it is: $f(3)$ just means “use 3 as the input.” The parentheses are not multiplication — they’re holding the input.

PRACTICE

Evaluate each function or solve for the unknown.

- | | |
|---|---|
| 1. $f(x) = 4x - 9$; $f(5)$ _____ | 11. $f(x) = ax + b$; $f(0)$ _____ |
| 2. $g(x) = x^2 + 2$; $g(-3)$ _____ | 12. $f(x) = 2x^2 + x - 3$; $f(1)$ _____ |
| 3. $h(x) = -2x + 7$; $h(0)$ _____ | 13. $f(x) = 5x + 2$; $f(-1)$ _____ |
| 4. $f(x) = 3x^2 - x$; $f(2)$ _____ | 14. $f(x) = x - 3 $; $f(-2)$ _____ |
| 5. $p(x) = \frac{x + 6}{2}$; $p(8)$ _____ | 15. $g(x) = \sqrt{x + 9}$; $g(7)$ _____ |
| 6. $g(x) = 7 - 3x$; $g(-4)$ _____ | 16. $f(x) = x^3$; $f(-2)$ _____ |
| 7. $f(x) = 2x + 5$; $f(x) = 17$, $x = ?$ _____ | 17. $f(x) = 4x$; solve $f(x) = 0$ _____ |
| 8. $g(x) = x^2 - 1$; $g(x) = 24$, $x = ?$ _____ | 18. $g(x) = 2x + 7$; solve $g(x) = g(3)$ _____ |
| 9. $h(x) = -x + 10$; $h(x) = 3$, $x = ?$ _____ | 19. $f(x) = x^2$; $f(a + 1)$ _____ |
| 10. $f(x) = 6x$; $f(x) = 42$, $x = ?$ _____ | 20. $f(x) = 3x - 1$; $f(f(2))$ _____ |

Visual Practice

Use the graph, table, chart, or diagram to answer the question.

21. Use the table to find $f(2)$.

x	-1	0	2	4
$f(x)$	5	3	7	11

Answer: _____

22. Use the table to find $f(-2)$.

x	-2	0	1	3
$f(x)$	9	5	2	-4

Answer: _____

Word Problems

23. A phone plan’s monthly cost is $C(m) = 0.10m + 25$, where m is minutes used. Find the cost for 120 minutes. How many minutes for a \$40 budget? _____
24. The height of a ball is modeled by $h(t) = -16t^2 + 48t + 4$ feet, where t is the time in seconds after it is thrown. Find $h(1)$ and $h(2)$ and state what the outputs mean. _____
25. A delivery driver charges $f(d) = 2.50 + 1.75d$ for d miles. Find the cost of a 6-mile delivery. If the customer paid \$15, how many miles? _____
26. A lab starts with 100 bacteria, and the count doubles every hour according to $B(t) = 100 \cdot 2^t$. How many bacteria are there at $t = 3$ hours, and what does $B(0)$ represent? _____



Answer Keys

- | | |
|--|---|
| 1. <input type="text" value="11"/> | 14. <input type="text" value="5"/> |
| 2. <input type="text" value="11"/> | 15. <input type="text" value="4"/> |
| 3. <input type="text" value="7"/> | 16. <input type="text" value="-8"/> |
| 4. <input type="text" value="10"/> | 17. <input type="text" value="x = 0"/> |
| 5. <input type="text" value="7"/> | 18. <input type="text" value="x = 3"/> |
| 6. <input type="text" value="19"/> | 19. <input type="text" value="a^2 + 2a + 1"/> |
| 7. <input type="text" value="x = 6"/> | 20. <input type="text" value="14"/> |
| 8. <input type="text" value="x = ±5"/> | 21. <input type="text" value="7"/> |
| 9. <input type="text" value="x = 7"/> | 22. <input type="text" value="9"/> |
| 10. <input type="text" value="x = 7"/> | 23. <input type="text" value="\$37; 150 min"/> |
| 11. <input type="text" value="b"/> | 24. <input type="text" value="h(1) = 36, h(2) = 36"/> |
| 12. <input type="text" value="0"/> | 25. <input type="text" value="\$13; 7.14 miles"/> |
| 13. <input type="text" value="-3"/> | 26. <input type="text" value="B(3) = 800, B(0) = 100"/> |

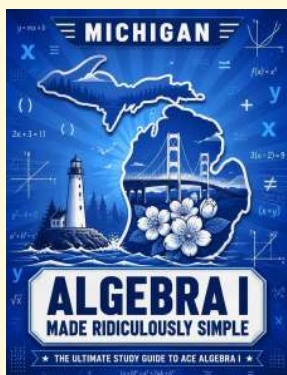
Step-by-Step Tutor Notes

- Put the given value into the expression first, then simplify from the inside out. Substitute: $f(5) = 4(5) - 9 = 20 - 9 = 11$. That confirms the final answer is 11.
- Put the given value into the expression first, then simplify from the inside out. Substitute (in parentheses!): $g(-3) = (-3)^2 + 2 = 9 + 2 = 11$. That confirms the final answer is 11.
- $h(0) = -2(0) + 7 = 0 + 7 = 7$. (Using 0 as the input usually gives the y -intercept.)
- Focus on the main idea of the problem, then simplify carefully. $f(2) = 3(2)^2 - 2 = 3(4) - 2 = 12 - 2 = 10$. So the answer is 10.
- Start with the definition the problem is testing, then apply it directly. $p(8) = \frac{8+6}{2} = \frac{14}{2} = 7$. So the answer is 7.
- $g(-4) = 7 - 3(-4) = 7 + 12 = 19$. Watch the sign — -3 times -4 is positive.
- Move carefully through the arithmetic; one clean operation usually unlocks the next one. Set equal: $2x + 5 = 17$. Subtract 5: $2x = 12$. Divide: $x = 6$. After simplifying, the answer is $x = 6$.
- $x^2 - 1 = 24$, so $x^2 = 25$. Two solutions: $x = 5$ or $x = -5$ (squaring loses sign info).
- For a table question, slow down and locate the exact row, column, or cell before calculating. $-x + 10 = 3 \Rightarrow -x = -7 \Rightarrow x = 7$. This gives $x = 7$.
- Work one inverse operation at a time and keep both sides balanced. Divide both sides by 6: $x = 7$. After simplifying, the answer is $x = 7$.
- Focus on the main idea of the problem, then simplify carefully. $f(0) = a(0) + b = b$. The y -intercept is always $f(0)$. So the answer is b .
- Use the structure of the expression to find the important point, then check that it fits the context. $f(1) = 2(1) + 1 - 3 = 2 + 1 - 3 = 0$. (A zero at $x = 1$). That leads to 0.
- Use the clue in the question first, then let the arithmetic finish the job. $f(-1) = 5(-1) + 2 = -5 + 2 = -3$. So the answer is -3 .
- Start with the definition the problem is testing, then apply it directly. $f(-2) = |-2 - 3| = |-5| = 5$. Absolute value strips the sign. So the answer is 5.
- This is a good place to slow down, check the notation, and simplify cleanly. $g(7) = \sqrt{7+9} = \sqrt{16} = 4$. So the answer is 4.
- Use the clue in the question first, then let the arithmetic finish the job. $f(-2) = (-2)^3 = -8$. Negative cubed stays negative. So the answer is -8 .
- $4x = 0$, so $x = 0$. (The only zero of a non-horizontal line through the origin is at $x = 0$.)
- $g(3) = 2(3) + 7 = 13$. So solve $2x + 7 = 13$: $x = 3$. (A one-to-one function maps each output back to one input.)
- Substitute $a + 1$ for x : $f(a + 1) = (a + 1)^2 = a^2 + 2a + 1$. (Expanding by FOIL.)
- Inside first: $f(2) = 3(2) - 1 = 5$. Now $f(5) = 3(5) - 1 = 14$. (Composing means feeding the output back as the input.)
- Read the table by matching the correct row and column first, then use the count or total that fits the question. Look in the row for $x = 2$. The matching function value is 7. This gives 7.
- This is a good place to slow down, check the notation, and simplify cleanly. When $x = -2$, the table gives $f(x) = 9$. So the answer is 9.
- Evaluate $C(120) = 0.10(120) + 25 = 12 + 25 = 37$. For \$40: set $0.10m + 25 = 40$, so $0.10m = 15$, giving $m = 150$ minutes.
- $h(1) = -16(1)^2 + 48(1) + 4 = -16 + 48 + 4 = 36$ ft. $h(2) = -16(4) + 48(2) + 4 = -64 + 96 + 4 = 36$ ft. (Same height because the ball passes that level on the way up and again on the way down.)
- $f(6) = 2.50 + 1.75(6) = 2.50 + 10.50 = 13.00$. For \$15: $2.50 + 1.75d = 15$, so $1.75d = 12.50$, giving $d \approx 7.14$ miles.
- $B(3) = 100 \cdot 2^3 = 100 \cdot 8 = 800$. $B(0) = 100 \cdot 2^0 = 100 \cdot 1 = 100$. (Any nonzero number to the 0 power is 1.)



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