

Functions, Domain, Range, and Properties

Function meaning, domain and range, properties, and basic graph behavior.

Name _____ Date _____

32 main 2-up grid 3 pages

Completion Reward



Shown here as a small pack artifact, not a preview destination.

1. What must be true for a relation to be a function?

input	output
1	4
2	5
3	5

A relation is a function only if no input is assigned two different outputs.

- A. Each output has exactly one input.
- B. Each input has exactly one output.
- C. Every output must be positive.
- D. The graph must be a line.

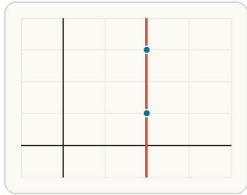
2. What does the domain of a function describe?

- A. The set of all outputs
- B. The graph's slope
- C. The function's intercepts only
- D. The allowed input values

3. What does the range of a function describe?

- A. The allowed input values
- B. The function's equation only
- C. The x-intercepts only
- D. The output values the function can produce

4. What does the vertical line test check?



If a vertical line hits the graph more than once, that x-value would have more than one output.

- A. Whether a graph has a y-intercept
- B. Whether a graph is increasing
- C. Whether a graph gives only one y-value for each x-value
- D. Whether a graph is symmetric

5. What does it mean for a function to be increasing on an interval?

- A. The graph stays above the x-axis.
- B. Larger x-values give larger y-values on that interval.
- C. The graph has no intercepts.
- D. The function must be linear there.

6. What symmetry does an even function have?

- A. Symmetry about the x-axis
- B. Symmetry about the origin
- C. Symmetry about the y-axis
- D. No symmetry at all

7. What symmetry does an odd function have?

- A. Symmetry about the y-axis
- B. Symmetry about the x-axis
- C. Symmetry about the origin
- D. No symmetry at all

8. What is a maximum value of a function?

- A. A highest output value on the interval being discussed
- B. A largest input value in the domain
- C. The point where $x = 0$
- D. The slope at the y-intercept

9. Which domain matches $f(x) = \sqrt{x + 4}$?

- A. $x \geq -4$
- B. $x \leq -4$
- C. $x \neq -4$
- D. all real numbers

10. Which domain matches $g(x) = 1 / (x - 3)$?

- A. $x \geq 3$
- B. $x \leq 3$
- C. all real numbers
- D. $x \neq 3$

11. Which function is even?

- A. $f(x) = x^3$
- B. $f(x) = x^2 + 1$
- C. $f(x) = x + 2$
- D. $f(x) = x^3 + 1$

12. Which function is odd?

- A. $f(x) = x^2$
- B. $f(x) = x^2 + 1$
- C. $f(x) = x^3$
- D. $f(x) = |x|$

13. Which mapping is a function?

- A. $1 \rightarrow 4$ and $1 \rightarrow 5$, $2 \rightarrow 6$
- B. $2 \rightarrow 3$ and $2 \rightarrow 1$, $4 \rightarrow 6$
- C. $1 \rightarrow 4$, $2 \rightarrow 5$, $3 \rightarrow 5$
- D. $5 \rightarrow 2$ and $5 \rightarrow 7$

14. What is the best first step when finding the domain of a rational function?

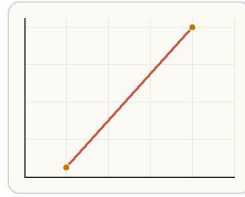
- A. Set the numerator equal to 0.
- B. Make every output positive.
- C. Differentiate the function.
- D. Set the denominator not equal to 0.

15. A student says $\sqrt{x - 7}$ is defined for $x \leq 7$. What is the mistake?

- A. Square-root functions are never defined.
- B. The student should have set $x = 0$ only.
- C. The radicand must be at least 0, so x must be at least 7.
- D. The student should have made x negative.

16. If $f(x) = 2x + 1$, find $f(3)$. Answer with a number.

17. For $f(x) = x^2$, find the average rate of change from $x = 1$ to $x = 4$. Answer with a number.



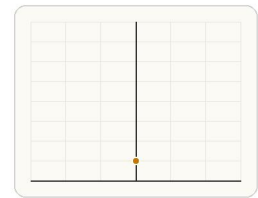
Compute average rate of change by comparing the output change to the input change between the two points.

18. For $f(x) = \sqrt{x - 2}$, what is the smallest allowed x -value? Answer with a number.

19. For $g(x) = 1 / (x + 5)$, what x -value is excluded from the domain? Answer with a number.

20. For $h(x) = x^2 - 4$, what is the y -intercept value? Answer with a number.

21. What is the minimum value of $y = x^2 + 1$? Answer with a number.

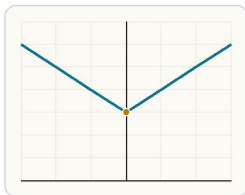


Because the parabola opens upward, its least output is the y -value of the vertex.

22. What is the least possible output of $y = |x| + 3$? Answer with a number.

23. If $p(x) = x^3 - 2$, find $p(-1)$. Answer with a number.

24. Which student correctly finds the average rate of change of $f(x) = x^2$ from $x = 1$ to $x = 3$?



The graph of $y = |x| + 3$ starts at $y = 3$ and rises on both sides, so 3 is the minimum output.

- A. Student B: $(3 - 1) / (9 - 1) = 2 / 8 = 0.25$.
- B. Student A: $(9 - 1) / (3 - 1) = 8 / 2 = 4$.
- C. Student C: $3^2 - 1 = 8$ so the answer is 8.
- D. Student D: $1^2 + 3^2 = 10$ so the answer is 10.

25. State the domain of $f(x) = \sqrt{x - 1}$. Answer as an inequality in x .

26. State the domain of $g(x) = 1 / (x + 2)$. Answer as a restriction on x .

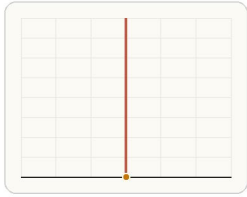
27. State the range of $y = x^2$. Answer as an inequality in y .

28. State the range of $y = -x^2 + 4$. Answer as an inequality in y .

29. Classify $f(x) = x^2 + 3$ as even or odd. Answer with one word.

30. Classify $f(x) = x^3$ as even or odd. Answer with one word.

31. For $y = x^2$, state the axis of symmetry. Answer as an equation.



The axis of symmetry is the vertical line that passes through the vertex and reflects the graph onto itself.

32. State the domain of $h(x) = \sqrt{9 - x}$. Answer as an inequality in x .