

Precalculus · Functions: Domain, Range, Composition and Inverses · Quiz

Common Core F-IF.A.1, F-BF.A.1c, F-BF.B.4b, F-BF.B.4c, F-BF.B.4d · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus functions review quiz asks 10 multiple-choice questions on functions: domain, range, composition and inverses, and each answer comes with a short explanation.

Answer these 10 questions on domain, composition, decomposition, inverse functions and restricted domains. Each question has exactly one correct answer, and the explanation names the most common mistake. Aim for at least 8 correct.

Precalculus Common Core: F-IF.A.1 · F-BF.A.1c · F-BF.B.4b · F-BF.B.4c · F-BF.B.4d

Questions

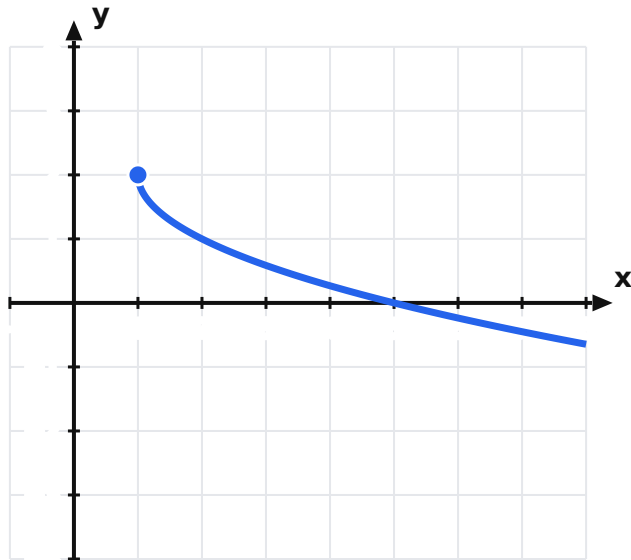
Question 1

What is the domain of $f(x) = \frac{\sqrt{x-3}}{x-7}$?

- A. $[3, \infty)$
- B. $[3, 7) \cup (7, \infty)$
- C. $(3, 7) \cup (7, \infty)$
- D. $(-\infty, 7) \cup (7, \infty)$

Question 2

The graph shows a function f that starts at $(1, 2)$ and heads down and to the right. What is its range?



Graph of the function.

- A. $[2, \infty)$
- B. $[1, \infty)$
- C. $(-\infty, 2]$
- D. $(-\infty, 1]$

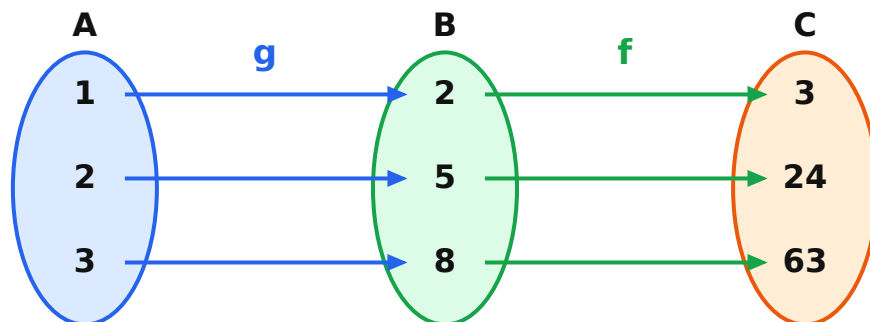
Question 3

Let $f(x) = x^2 - 1$ and $g(x) = x + 3$. Which expression equals $f(g(x))$?

- A. $x^2 + 2$
- B. $x^2 + 6x + 8$
- C. $x^2 + 8$
- D. $x^2 + 6x + 10$

Question 4

In the mapping diagram, g sends 1, 2, 3 to 2, 5, 8 and f sends 2, 5, 8 to 3, 24, 63. What is $f(g(2))$?



Mapping diagram for g (set A to set B) followed by f (set B to set C).

- A. 24
- B. 5
- C. 2
- D. 63

Question 5

Which pair of functions gives $h(x) = \frac{1}{(x-3)^2}$ when $h(x) = f(g(x))$?

- A. $f(x) = \frac{1}{x-3}$ and $g(x) = x^2$
- B. $f(x) = \frac{1}{x}$ and $g(x) = x^2 - 3$
- C. $f(x) = \frac{1}{x^2}$ and $g(x) = x - 3$
- D. $f(x) = x - 3$ and $g(x) = \frac{1}{x^2}$

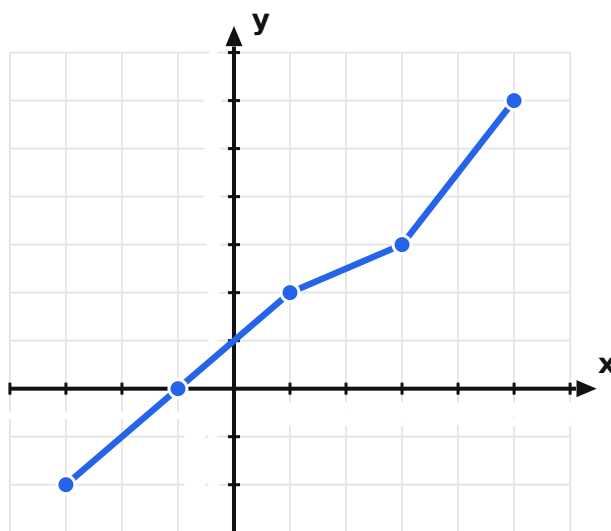
Question 6

What is the inverse function of $f(x) = \frac{x+5}{2}$?

- A. $f^{-1}(x) = \frac{2}{x+5}$
- B. $f^{-1}(x) = 2x+5$
- C. $f^{-1}(x) = \frac{x-5}{2}$
- D. $f^{-1}(x) = 2x-5$

Question 7

The graph of a one-to-one function f passes through $(-3, -2)$, $(-1, 0)$, $(1, 2)$, $(3, 3)$ and $(5, 6)$. What is $f^{-1}(2)$?



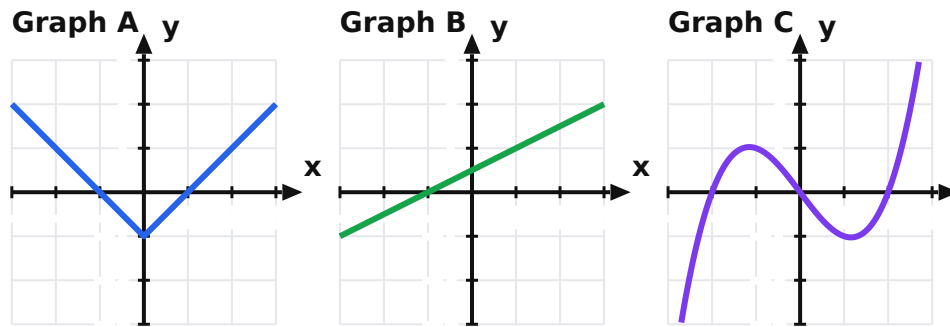
Graph of f .

- A. 2
- B. 3
- C. $\frac{1}{2}$

D. 1

Question 8

Which graph has an inverse function?



Three graphs labeled A, B and C.

- A. Graph B only
- B. Graph A only
- C. Graph C only
- D. Graphs A and B

Question 9

What is the inverse of $f(x) = (x-4)^2$ for $x \geq 4$?

- A. $f^{-1}(x) = 4 - \sqrt{x}$
- B. $f^{-1}(x) = \sqrt{x} - 4$
- C. $f^{-1}(x) = 4 + \sqrt{x}$
- D. $f^{-1}(x) = \sqrt{x+4}$

Question 10

If $f(4) = -1$ for a one-to-one function f , which statement must be true?

- A. $f^{-1}(-1) = 4$
- B. $f^{-1}(4) = -1$
- C. $f^{-1}(-1) = \frac{1}{4}$
- D. $f^{-1}(1) = -4$

Answer key

1. **B** - The root needs $x \geq 3$ and the denominator rules out $x = 7$. Forgetting the denominator gives $[3, \infty)$.
2. **C** - The curve never rises above the starting height 2, so the range is $(-\infty, 2]$. The interval $[1, \infty)$ is the domain.
3. **B** - $f(g(x)) = (x+3)^2 - 1 = x^2 + 6x + 8$. The choice $x^2 + 2$ is $g(f(x))$, the wrong order.
4. **A** - $g(2) = 5$ and $f(5) = 24$. The value 5 stops after the first function.
5. **C** - The inside is $x - 3$, and the outer rule squares then takes the reciprocal. The other pairs apply the steps in the wrong order.
6. **D** - Swap to get $x = \frac{y+5}{2}$, so $y = 2x - 5$. The reciprocal $\frac{2}{x+5}$ is not an inverse function.
7. **D** - The output 2 occurs at $x = 1$, so $f^{-1}(2) = 1$. Answering 2 confuses the input with the output.
8. **A** - Only the line passes the horizontal line test. Graph A is a V that repeats every height, and graph C has a hump and a dip that repeat heights.
9. **C** - Swap to get $x = (y-4)^2$, so $y = 4 \pm \sqrt{x}$. Because $y \geq 4$, the plus sign is correct.
10. **A** - An inverse swaps input and output, so the pair $(4, -1)$ becomes $(-1, 4)$. Writing $f^{-1}(4) = -1$ does not swap them.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Standards F-IF.A.1, F-BF.A.1c, F-BF.B.4b, F-BF.B.4c and F-BF.B.4d: notation, composition, inverses and restricted domains.
- Domain rules: no zero denominators, no negative numbers under even roots, and only positive inputs for $\ln$.
- In $f(g(x))$, the input must be in the domain of g and $g(x)$ must be in the domain of f .
- $f^{-1}(f(x)) = x$ and $f(f^{-1}(x)) = x$; the domain of f is the range of f^{-1} and the reverse.
- A function has an inverse function only if it passes the horizontal line test; restrict the domain when it fails.

How to use this precalculus functions review quiz

Retake this precalculus functions review quiz until every answer is right, then move on to the worksheet and the test.

