

Algebra 2 · Function Operations, Composition and Inverses · Quiz

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

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

Ten multiple-choice questions on function operations, composition, and inverse functions. Choose the single best answer, and use graphs, composition checks, and domain restrictions to confirm your choice. Each explanation shows the idea and the most common mistake.

Algebra 2 Common Core: **F-BF.A.1b · F-BF.A.1c · F-BF.B.4a**

Questions

Question 1

Let $f(x) = x^2 - 4x$ and $g(x) = 3x + 2$. What is $(f + g)(x)$?

- A. $x^2 - 7x - 2$
- B. $x^2 - x - 2$
- C. $x^2 - x + 2$
- D. $x^2 + 7x + 2$

Question 2

Let $f(x) = 2x + 3$ and $g(x) = x^2 - 1$. What is $f(g(2))$?

- A. 48
- B. 10
- C. 21
- D. 9

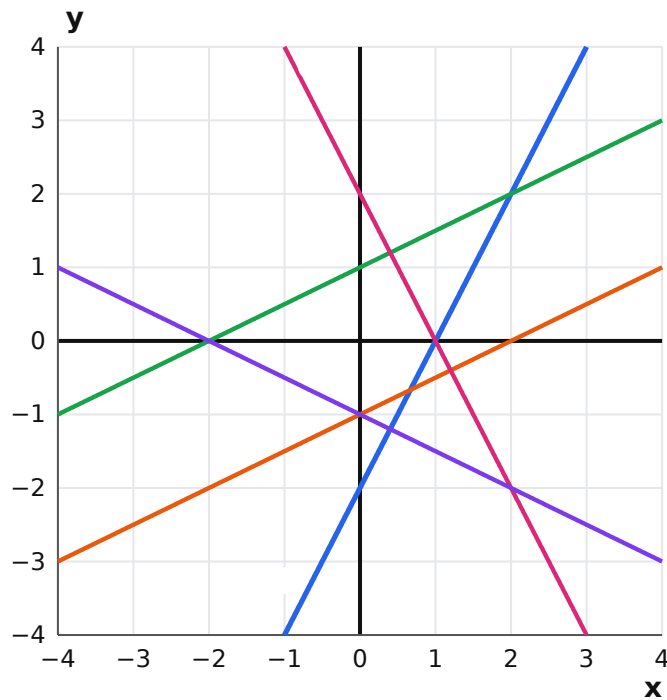
Question 3

What is the inverse of $f(x) = 3x - 6$?

- A. $f^{-1}(x) = \frac{x+6}{3}$
- B. $f^{-1}(x) = \frac{x}{3} + 6$
- C. $f^{-1}(x) = \frac{x-6}{3}$
- D. $f^{-1}(x) = -3x + 6$

Question 4

Which line is the graph of f^{-1} ?



The graph of f (blue) and four candidate lines.

- A. Line A
- B. Line B
- C. Line C
- D. Line D

Question 5

Let $f(x) = \sqrt{x}$ and $g(x) = x+6$. What is the domain of $f(g(x))$?

- A. $x \geq 6$
- B. $x \geq -6$
- C. $x \geq 0$
- D. $x \leq -6$

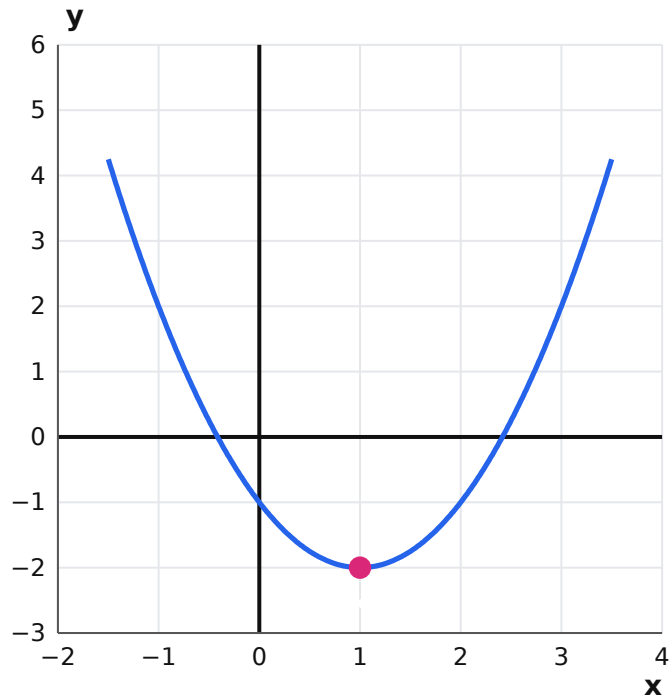
Question 6

Which pair of functions are inverses of each other?

- A. $f(x) = 4x+1$ and $g(x) = \frac{x+1}{4}$
- B. $f(x) = 4x+1$ and $g(x) = \frac{x-1}{4}$
- C. $f(x) = 4x+1$ and $g(x) = \frac{1}{4x+1}$
- D. $f(x) = 4x+1$ and $g(x) = -4x-1$

Question 7

The graph shows $f(x) = (x-1)^2 - 2$. Which domain restriction makes f one-to-one?

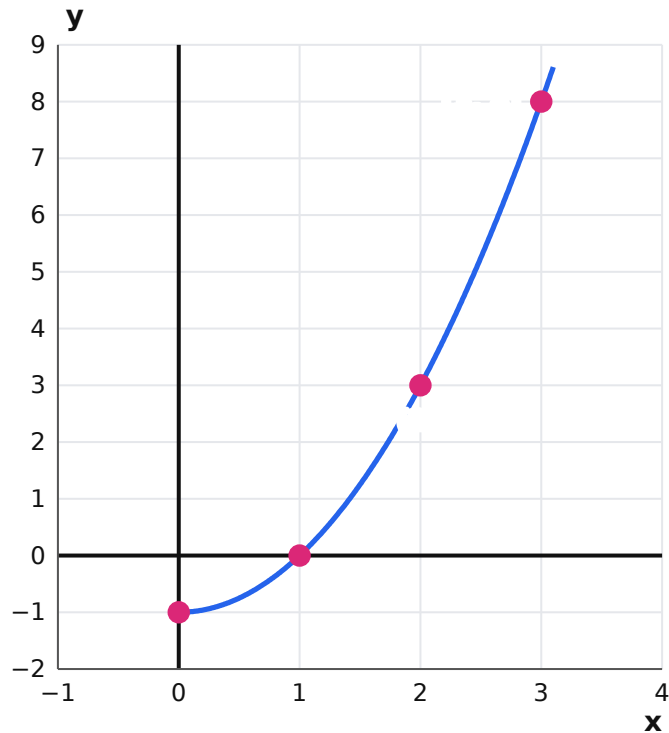


The graph of $f(x) = (x - 1)^2 - 2$.

- A. $x \geq -2$
- B. $-1 \leq x \leq 3$
- C. $x \geq 1$
- D. all real numbers

Question 8

Using the graph of $f(x) = x^2 - 1$ for $x \geq 0$, what is $f^{-1}(3)$?



The graph of $f(x) = x^2 - 1$ for $x \geq 0$.

- A. 8
- B. 10
- C. $\sqrt{2}$
- D. 2

Question 9

The radius of a circle is $r(t) = 4t$ and its area is $A(r) = \pi r^2$. What is $A(r(t))$?

- A. $4\pi t^2$
- B. $16\pi t^2$
- C. $16\pi^2 t^2$
- D. $8\pi t^2$

Question 10

Let $f(x) = x + 2$ and $g(x) = x - 5$. What is $(fg)(x)$?

- A. $x^2 + 3x - 10$
- B. $2x - 3$
- C. $x^2 - 10$
- D. $x^2 - 3x - 10$

Answer key

1. **C** - Add like terms: $x^2 - 4x + 3x + 2 = x^2 - x + 2$. Subtracting instead gives the first wrong choice.
2. **D** - $g(2) = 3$ and $f(3) = 9$. The value 48 is $g(f(2))$, the composition in the wrong order.
3. **A** - Swap and solve: $x = 3y - 6$, so $y = \frac{x+6}{3}$. Dividing only x by 3 is a common slip.
4. **A** - Line A is $y = \frac{x+2}{2}$, the reflection of f across $y = x$: it contains $(-2, 0)$, $(0, 1)$ and $(2, 2)$.
5. **B** - $f(g(x)) = \sqrt{x+6}$ needs $x+6 \geq 0$, so $x \geq -6$.
6. **B** - $f\left(\frac{x-1}{4}\right) = x - 1 + 1 = x$ and the other composition also gives x . The reciprocal is not an inverse.
7. **C** - The vertex is at $x = 1$, so one side of the axis of symmetry is one-to-one. On $x \geq -2$ the inputs -2 and 4 both give 7 .
8. **D** - $f^{-1}(3)$ is the input that gives output 3 , and the point $(2, 3)$ is on the graph. The value 8 is $f(3)$.
9. **B** - $\pi(4t)^2 = 16\pi t^2$. Forgetting to square the 4 gives 4 , and squaring only t ignores the coefficient.
10. **D** - $(x+2)(x-5) = x^2 - 5x + 2x - 10 = x^2 - 3x - 10$. The choice $2x - 3$ is the sum, not the product.

Remember:

- Composition: $(f \circ g)(x) = f(g(x))$; the inner function g runs first and order usually matters.
- Inverse method: write $y = f(x)$, swap x and y , solve for y , rename it $f^{-1}(x)$.
- Two functions are inverses when $f(g(x)) = x$ and $g(f(x)) = x$ for every x in the domains.
- The graph of f^{-1} is the reflection of the graph of f across the line $y = x$; points (a, b) become (b, a) .
- Only one-to-one functions have inverses; restrict the domain (such as $x \geq 0$ for x^2) when needed.