

# Algebra 2 - Composition and Inverse Functions - Test

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

This 45-minute test on composition and inverse functions has 9 questions worth 20 points in total. The questions move from direct skills to multi-step problems. Show your work, because partial credit is given for a correct setup and sound reasoning.

## About this test

- Grade: Algebra 2
- Chapter: Composition and Inverse Functions
- Standards: F-BF.A.1c, F-BF.B.4a
- Time: 45 minutes
- Total: 20 points

## Question 1 - Compose from tables [2 pts]

| x    | 0 | 1 | 2 | 3 |
|------|---|---|---|---|
| f(x) | 2 | 3 | 1 | 0 |
| g(x) | 3 | 0 | 2 | 1 |

Values of f and g.

Use the table to find  $f(g(1))$  and  $g(f(2))$ .

## Question 2 - Compose expressions [3 pts]

Let  $f(x) = x^2 - 1$  and  $g(x) = 2x + 3$ . Find  $f(g(x))$  and  $g(f(x))$  in simplified form, and decide whether they are equal.

## Question 3 - Domain [2 pts]

Let  $f(x) = \sqrt{x}$  and  $g(x) = x - 5$ . Find  $f(g(x))$  and its domain.

#### Question 4 - Linear inverse [2 pts]

Find the inverse of  $f(x) = \frac{x-4}{5}$ .

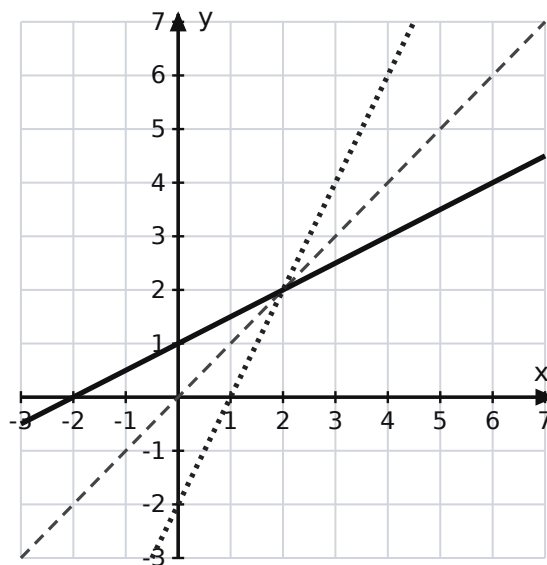
#### Question 5 - Rational inverse [3 pts]

Find the inverse of  $f(x) = \frac{2x+1}{x-3}$ .

#### Question 6 - Verify [2 pts]

Verify that  $f(x) = \sqrt[3]{x+7}$  and  $g(x) = x^3 - 7$  are inverses.

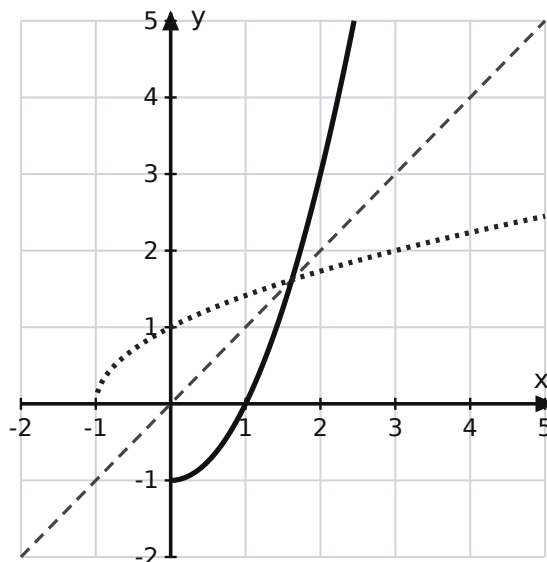
#### Question 7 - Graph of an inverse [2 pts]



Graph of  $f$  and a second line.

The graph of  $f(x) = \frac{x}{2} + 1$  is shown with a second line. The point  $(4, 3)$  is on  $f$ . Give the corresponding point on  $f^{-1}$  and find  $f^{-1}(x)$ .

#### Question 8 - Restricted domain [2 pts]



$$f(x) = x^2 - 1 \text{ for } x \geq 0.$$

Find the inverse of  $f(x) = x^2 - 1$  for  $x \geq 0$  and its domain.

### Question 9 - Find the error [2 pts]

Mei says  $f(g(x)) = g(f(x))$  for every pair of functions. Use  $f(x) = x + 1$  and  $g(x) = 2x$  to show that she is wrong.