

Combining and Inverting Functions

Grade 11 – Algebra 2 math · Test · Standards: F-BF.A.1b, F-BF.A.1c, F-BF.B.4a

Name: _____ Date: _____ Class: _____

This test covers combining functions, composition, finding and verifying inverse functions, and the graphs of inverses. Show the substitution in every composition, state restrictions on domains, and verify an inverse by composition when asked. No calculator is needed. The test is worth 20 points.

Standards: F-BF.A.1b, F-BF.A.1c, F-BF.B.4a · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Combining functions (2 points)

For $h(x) = x^2 - 3x$ and $k(x) = 2x + 7$, find $(h + k)(x)$ (1 point) and $(h \cdot k)(-2)$ (1 point).

Question 2 Composition (3 points)

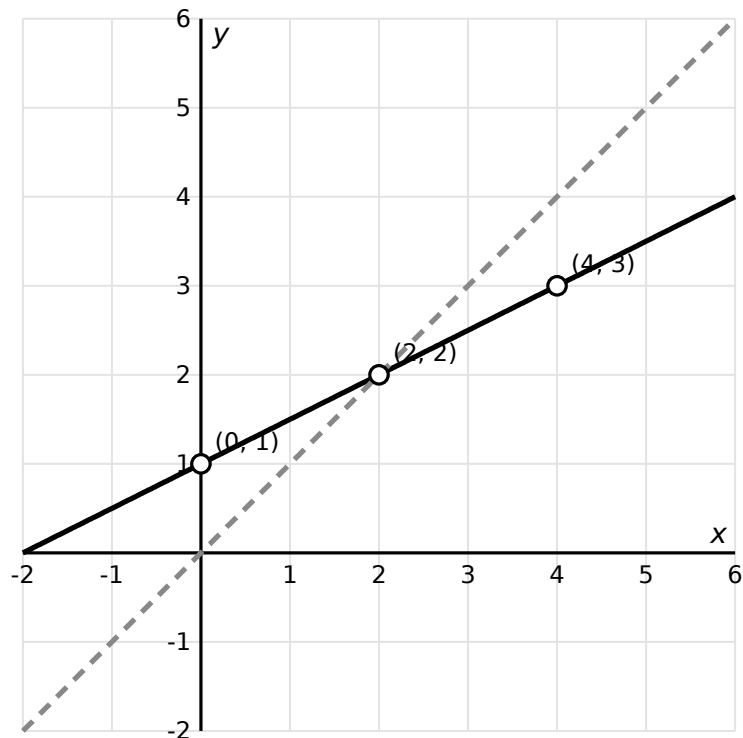
For $h(x) = 3x - 2$ and $k(x) = x^2 + 1$, find $h(k(x))$ (1 point), $k(h(x))$ (1 point), and $h(k(2))$ (1 point).

Question 3 Find an inverse (3 points)

Find the inverse of $h(x) = \frac{(3x - 8)}{5}$ (2 points) and verify one of the two compositions (1 point).

Question 4 Inverse from a graph (3 points)

The graph of a linear function h is shown with the dashed line $y = x$ and the points $(0, 1)$, $(2, 2)$, and $(4, 3)$.

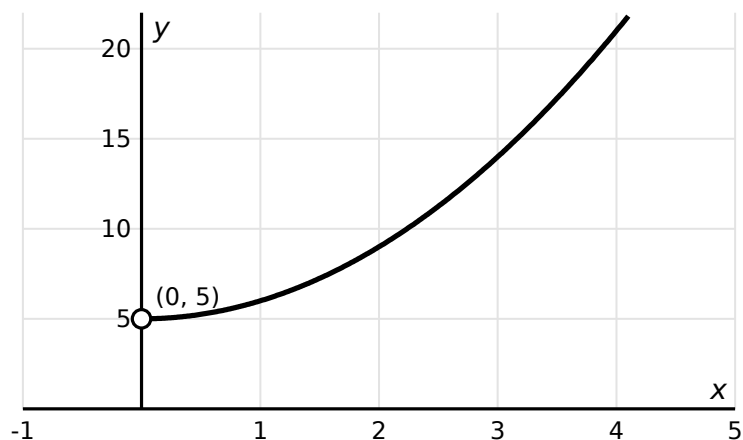


Graph of h .

- List three points on the graph of h^{-1} . (1 point)
- Write the equation of h^{-1} . (1 point)
- Which point is on both graphs? (1 point)

Question 5 Restricted domain (3 points)

The function $h(x) = x^2 + 5$ is defined only for $x \geq 0$. The graph is shown.



Graph of h .

- Find $h^{-1}(x)$. (2 points)
- State the domain and the range of h^{-1} . (1 point)

Question 6 Domain of a composition (2 points)

For $h(x) = \sqrt{x - 7}$ and $k(x) = x^2$, find $h(k(x))$ (1 point) and $k(h(x))$ (1 point), and state the domain of each.

Question 7 Sale and coupon (2 points)

A cart costs \$48. A 25%–off sale is $S(p) = 0.75p$ and an \$8 coupon is $K(p) = p - 8$. Find the price when the sale is applied first and when the coupon is applied first. Which order is cheaper?

Question 8 Verify inverses (2 points)

Show by composition that $h(x) = x^3 - 1$ and $k(x) = \sqrt[3]{x + 1}$ are inverses.