

Domains, Composition and Inverse Functions Explained

Grade 12 – Precalculus math · Test · Standards: F-IF.A.1, F-BF.A.1c, F-BF.B.4b, F-BF.B.4c, F-BF.B.4d

Name: _____ Date: _____ Class: _____

This 45-minute test has 9 questions worth 20 points. It covers domains, compositions, inverses from formulas, tables and graphs, and restricting a domain. Show every step, because partial credit follows the reasoning.

Standards: F-IF.A.1, F-BF.A.1c, F-BF.B.4b, F-BF.B.4c, F-BF.B.4d · **Level:** Grade 12 Precalculus

Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Domains in Interval Notation (2 points)

Write the domain of each function in interval notation.

a. $f(x) = \sqrt{2x - 9}$ (1 point)

b. $g(x) = \sqrt[3]{x^2 - 16}$ (1 point)

Question 2 Numerical Compositions (2 points)

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

a. Find $f(g(2))$. (1 point)

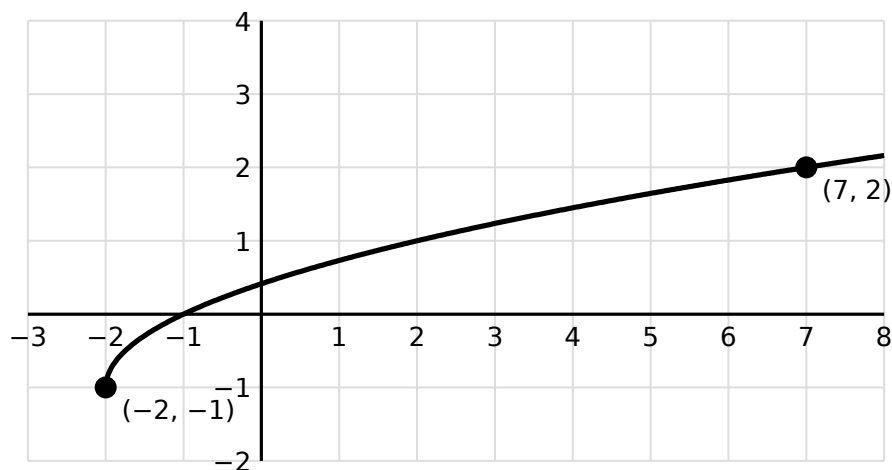
b. Find $g(f(-1))$. (1 point)

Question 3 Composite Expressions (2 points)

Let $f(x) = x^2 - 6x$ and $g(x) = x + 3$. Simplify $(f \circ g)(x)$ and $(g \circ f)(x)$.

Question 4 Domain, Range and Inverse from a Graph (2 points)

The graph of f starts at the closed point $(-2, -1)$ and continues to the right through $(7, 2)$.



Graph of f .

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

Question 5 Find an Inverse Function (3 points)

Determine f^{-1} for $f(x) = \frac{(4x + 3)}{(x - 2)}$.

Question 6 Verify Inverses (2 points)

Show that $f(x) = \sqrt[3]{x + 5} - 2$ and $g(x) = (x + 2)^3 - 5$ are inverse functions.

Question 7 Table of an Inverse (2 points)

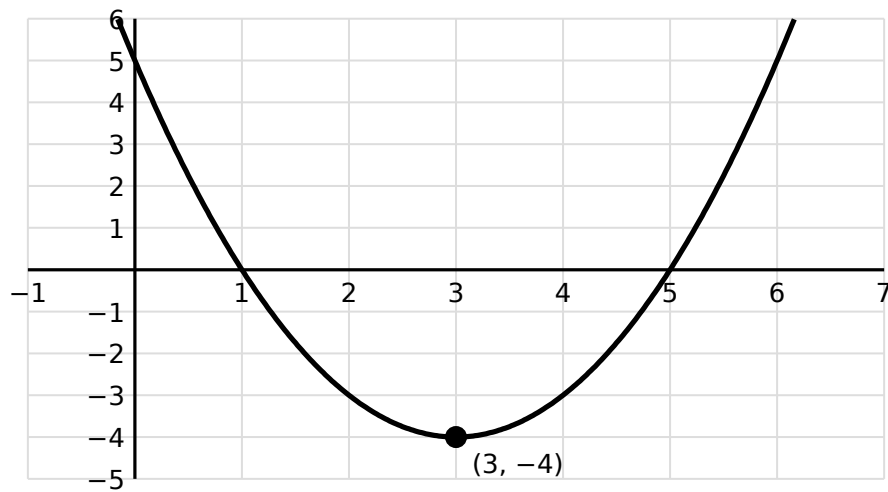
The one-to-one function f is given by the table.

x	-1	2	5	9
$f(x)$	7	3	0	-4

- Complete a table for f^{-1} with inputs 7, 3, 0 and -4. (1 point)
- Evaluate $f(f^{-1}(-4)) + f^{-1}(7)$. (1 point)

Question 8 Restrict a Parabola, Then Invert (3 points)

Let $f(x) = x^2 - 6x + 5$, shown below.



Graph of f .

- Write f in vertex form. (1 point)
- Restrict f to $x \geq 3$ and find the inverse. (1 point)
- State the domain and range of the inverse. (1 point)

Question 9 Sale Price with Tax (2 points)

A store takes 20% off the original price p , then adds 7% sales tax to the discounted price.

- Write the total cost $C(p)$ as one function of p . (1 point)
- Find the original price when the total is \$64.20. (1 point)