

Precalculus · Functions: Domain, Range, Composition and Inverses · Test Answer Key

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

This precalculus functions review test answer key gives the full solution and the scoring guide for each of the 9 test questions on functions: domain, range, composition and inverses.

Use this key to score the functions test out of 20 points. Each solution shows the full method and a scoring guide, so award partial credit for correct steps even when the final answer contains an arithmetic slip.

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

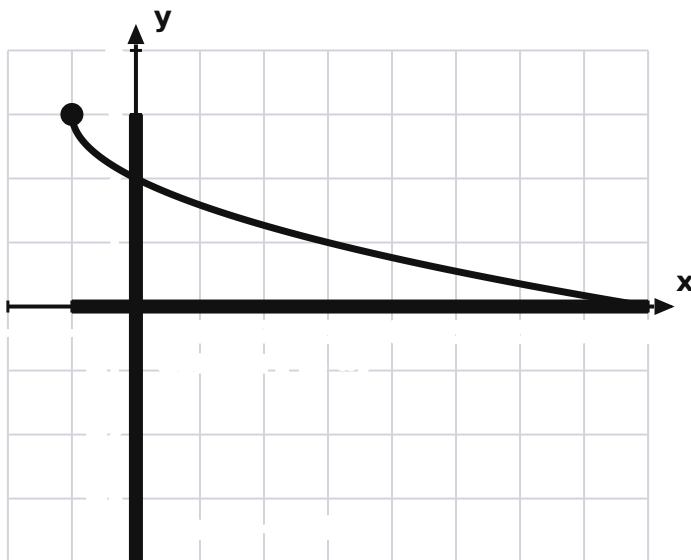
Precalculus Functions Review Test Answer Key: questions 1-5

Question 1: Domain in interval notation (2 points)

- a. $3x-12 \geq 0$ gives $x \geq 4$: $[4, \infty)$
- b. $x^2-x-6 = (x-3)(x+2)$ is zero at 3 and -2 : $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$

Scoring: 1 point for each correct domain; deduct half of a point for a wrong bracket type.

Question 2: Domain and range from a graph (2 points)



Domain on the x-axis and range on the y-axis.

- a. The graph begins at $x = -1$ and continues right forever: $[-1, \infty)$
- b. The graph begins at height 3 and goes down forever: $(-\infty, 3]$

Scoring: 1 point for each interval written with correct endpoints and brackets.

Question 3: Composition of functions (2 points)

- a. $f(g(x)) = (x+4)^2 - 3(x+4) = x^2 + 8x + 16 - 3x - 12 = x^2 + 5x + 4$
- b. $f(2) = 4 - 6 = -2$ and $g(-2) = 2 : 2$

Scoring: Part (a): 1 point for the correct simplified polynomial. Part (b): 1 point for the correct value.

Question 4: Decompose and find a domain (2 points)

- a. $g(x) = x^2 - 16$ and $f(x) = \sqrt{x}$
- b. $x^2 - 16 \geq 0$ means $x \leq -4$ or $x \geq 4$: $(-\infty, -4] \cup [4, \infty)$

Scoring: 1 point for a valid decomposition; 1 point for the correct domain (half credit if only one piece is given).

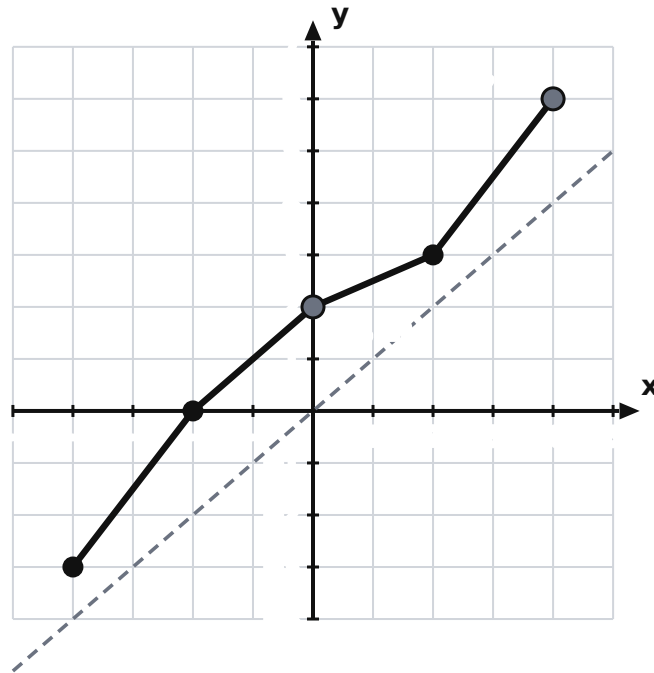
Question 5: Find and verify an inverse (3 points)

- a. Swap: $x = \frac{3y-2}{y+1}$, so $xy + x = 3y - 2$ and $y(x-3) = -x-2$. $f^{-1}(x) = \frac{x+2}{3-x}$
- b. The numerator is $\frac{3x-2+2x+2}{x+1} = \frac{5x}{x+1}$ and the denominator is $\frac{3x+3-3x+2}{x+1} = \frac{5}{x+1}$. Dividing gives x .

Scoring: Part (a): 1 point for swapping and clearing the fraction, 1 point for the correct inverse. Part (b): 1 point for a complete verification.

Precalculus Functions Review Test Answer Key: questions 6-9

Question 6: Inverse values from a graph (3 points)

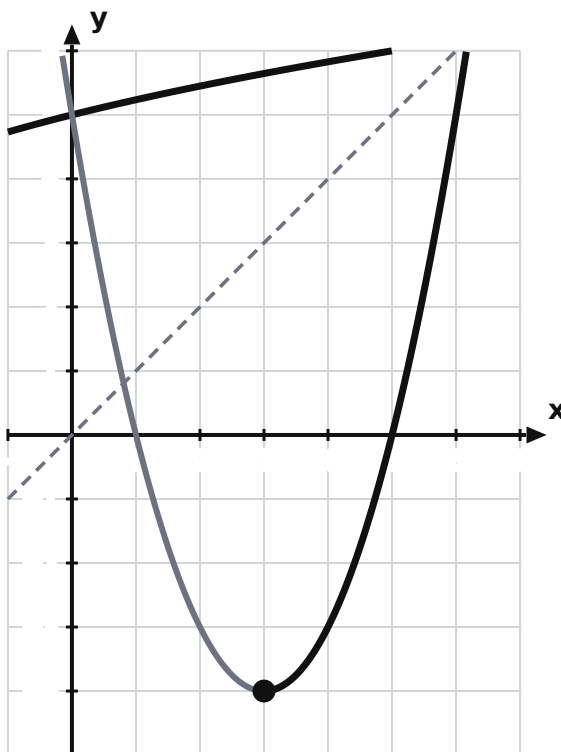


Inputs and outputs of f swap for f^{-1} .

- The output 2 occurs at $x=0$: $f^{-1}(2)=0$
- The output 6 occurs at $x=4$: $f^{-1}(6)=4$
- Domain of f^{-1} is the range of f : $[-3,6]$; range of f^{-1} is the domain of f : $[-4,4]$

Scoring: 1 point for each part; in part (c) both intervals are needed.

Question 7: Restrict a domain (3 points)



The right half ($x \geq 3$) and its mirror image across $y = x$.

- A horizontal line such as $y = 0$ meets the graph at $x = 1$ and $x = 5$, so f is not one-to-one.
- Complete the square: $f(x) = (x-3)^2 - 4$. Swap: $x = (y-3)^2 - 4$, so $(y-3)^2 = x+4$ and, since $y \geq 3$, $f^{-1}(x) = 3 + \sqrt{x+4}$, with domain $[-4, \infty)$.

Scoring: Part (a): 1 point for a valid reason (two inputs, one output). Part (b): 1 point for the inverse formula, 1 point for the domain.

Question 8: Temperature inverse (2 points)

- $F(C) = \frac{9}{5}C + 32$
- $F(-15) = \frac{9}{5}(-15) + 32 = -27 + 32 = 5: 5^\circ\text{F}$

Scoring: 1 point for each correct part.

Question 9: Find an unknown function (1 point)

Since $6x - 7 = 2(3x - 5) + 3$, $f(x) = 2x + 3$. Check: $f(g(x)) = 2(3x - 5) + 3 = 6x - 7$.

Scoring: 1 point for the correct function.

Scoring summary

Total
20 points: add the points of every question of this precalculus functions review test answer key.

How to use this precalculus functions review test answer key

Use this precalculus functions review test answer key to score the test fairly and to see which skills need more practice.

