

Precalculus - Functions, Domain and Range - Test Answer Key

Common Core F-IF.A.1, F-IF.A.2, F-IF.B.5 · maths-pdf.fr/en/

Scoring guide and worked solutions for the 9-question functions test. Partial credit follows the scoring note under each solution.

Precalculus · Common Core State Standards: **F-IF.A.1, F-IF.A.2, F-IF.B.5**

Question 1 - Evaluate [2 pts]

$$f(-1) = 1 + 3 + 2 = 6. \quad f(4) = 16 - 12 + 2 = 6.$$

$$f(-1) = 6, \quad f(4) = 6$$

Scoring: 1 point for each correct value.

Question 2 - Function or not [2 pts]

Each input appears once. Repeated outputs are allowed.

Yes, it is a function

Scoring: 1 point for the correct answer, 1 point for the reason (each input has one output).

Question 3 - Domain with root and fraction [2 pts]

$x + 2 \geq 0$ gives $x \geq -2$. The denominator excludes $x = 5$.

$$[-2, 5) \cup (5, \infty)$$

Scoring: 1 point for the root condition $x \geq -2$, 1 point for excluding 5 and correct notation.

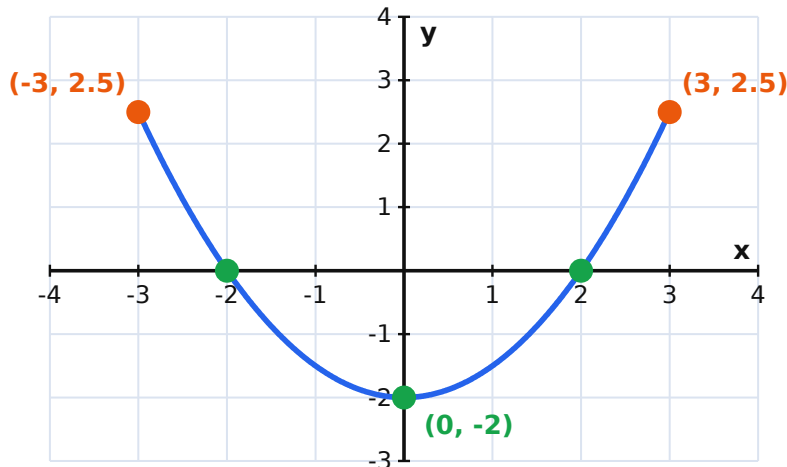
Question 4 - Domain of a rational function [2 pts]

$$x^2 - 9 = 0 \text{ gives } x = \pm 3.$$

$$(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$$

Scoring: 1 point for finding both excluded values, 1 point for notation.

Question 5 - Read a graph [3 pts]



Zeros at $x = -2$ and $x = 2$.

(a) Domain $[-3, 3]$; range $[-2, 2.5]$. (b) $f(0) = -2$. (c) $\frac{1}{2}x^2 - 2 = 0$ gives $x = \pm 2$.

Domain $[-3, 3]$; **range** $[-2, 2.5]$; $f(0) = -2$; $x = \pm 2$

Scoring: 1 point for domain and range together, 1 point for $f(0)$, 1 point for both zeros.

Question 6 - Piecewise function [2 pts]

$f(-3) = 2(-3) + 1 = -5$. $f(0) = 1$ because $0 \leq 0$. $f(3) = 9 - 4 = 5$.

$-5, 1, 5$

Scoring: 1 point for $f(-3)$ and $f(3)$ together, 1 point for $f(0)$ using the correct piece.

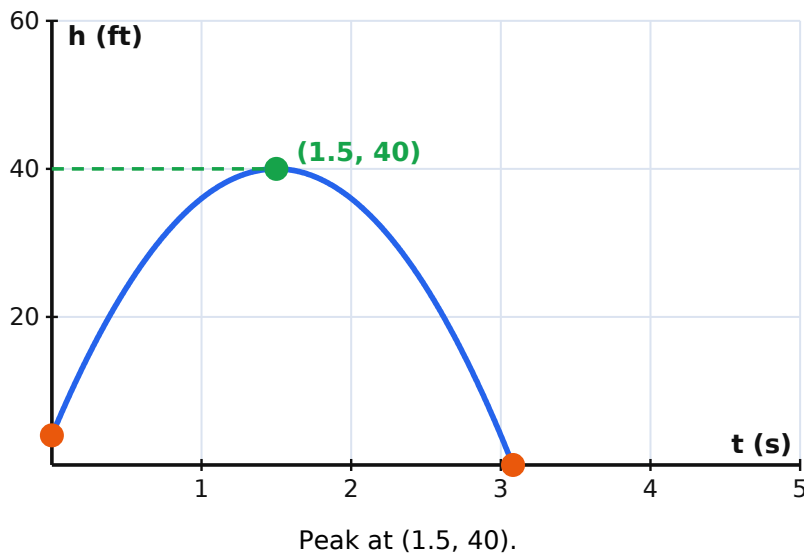
Question 7 - Difference quotient [2 pts]

$f(x+h) - f(x) = 2xh + h^2 - h$. Divide by h .

$2x + h - 1$

Scoring: 1 point for expanding $f(x+h)$ correctly, 1 point for simplifying.

Question 8 - Projectile model [3 pts]



(a) $h(0) = 4$ ft. (b) The vertex is at $t = \frac{-48}{2(-16)} = 1.5$, and $h(1.5) = -36 + 72 + 4 = 40$ ft. (c) From launch until landing: $0 \leq t \leq 3.08$ (the positive root of $h(t) = 0$).

4 ft; 40 ft; $[0, 3.08]$

Scoring: 1 point for each part.

Question 9 - Rental cost model [2 pts]

$R(250) = 30 + 100 = 130$. Solve $30 + 0.40d = 98$: $0.40d = 68$, $d = 170$.

\$130; 170 miles

Scoring: 1 point for $R(250)$, 1 point for solving for d .

Total

20 points