

Algebra 1 - Functions and Function Notation - Answer Key

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

Here are full solutions for the functions worksheet. Read each step, not just the bold answer, and compare it with your own method. Redo any problem you missed, and note which kind of mistake you made so you can avoid it on the test.

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

Exercise 1 - Function or not

Each input (1, 2, 3, 4) appears once, so each has exactly one output.

Yes, it is a function

Exercise 2 - Repeated input

The input 1 is paired with both 5 and 9.

No, it is not a function

Exercise 3 - Mapping diagram

Each input has exactly one arrow. Two inputs sharing the output 5 is allowed.

Domain: {1,2,3}. Range: {4,5}.

Yes, it is a function

Exercise 4 - Table check

The input $x = 4$ has two outputs, 3 and 6.

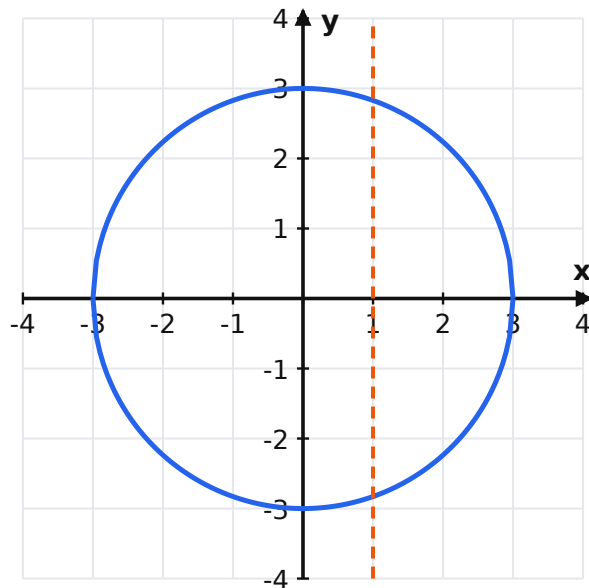
No, it is not a function

Exercise 5 - Vertical line test

Every vertical line crosses this non-vertical line only once.

Yes, it is a function

Exercise 6 - Circle graph



The line $x=1$ meets the circle twice.

A vertical line such as $x=1$ crosses the circle at two points, so one input has two outputs.

No, it is not a function

Exercise 7 - Evaluate a function

$$f(5) = 3(5) - 4 = 15 - 4 = 11.$$

$$f(5) = 11$$

Exercise 8 - Quadratic function value

$$f(-3) = (-3)^2 + 2(-3) - 3 = 9 - 6 - 3 = 0.$$

$$f(-3) = 0$$

Exercise 9 - Negative input

$$g(-4) = -2(-4) + 7 = 8 + 7 = 15.$$

$$g(-4) = 15$$

Exercise 10 - Evaluate h

$$h(2) = 5(2)^2 - 3 = 5(4) - 3 = 20 - 3 = 17.$$

$$h(2) = 17$$

Exercise 11 - Find the input

Set $2x + 1 = 15$. Subtract 1: $2x = 14$.

Divide by 2: $x = 7$.

$$x = 7$$

Exercise 12 - Two functions

$$f(3) = 2(3) - 1 = 5 \text{ and } g(-2) = (-2)^2 = 4.$$

Add: $5 + 4 = 9$.

9

Exercise 13 - Read a table

Read the row with $x = 3$: $f(3) = 15$.

The output 9 appears in the row with $x = 1$.

$$f(3) = 15; x = 1$$

Exercise 14 - Domain and range

Domain: the x-values $\{-2, 0, 3, 5\}$.

Range: the y-values, listing 4 once: $\{-2, 1, 4\}$.

Domain $\{-2, 0, 3, 5\}$; **range** $\{-2, 1, 4\}$

Exercise 15 - Domain and range from a graph

The x-values run from -3 to 4 , and the y-values run from 1 to 5 .

Domain $-3 \leq x \leq 4$; **range** $1 \leq y \leq 5$

Exercise 16 - Gas cost

$C(12) = 3.25(12) = 39$ dollars.

The tank holds up to 15 gallons, so the domain is $0 \leq g \leq 15$.

$C(0) = 0$ and $C(15) = 48.75$, so the range is $0 \leq C \leq 48.75$.

\$39; domain $0 \leq g \leq 15$; **range** $0 \leq C \leq 48.75$

Exercise 17 - Concert fee

n	T(n)
6	\$53
10	\$85
11	\$93

Ticket totals.

$T(6) = 8(6) + 5 = 53$.

Solve $8n + 5 = 93$: $8n = 88$, so $n = 11$.

\$53; 11 tickets

Exercise 18 - Rule in words

Rule: $f(x) = 3x - 2$.

$$f(-4) = 3(-4) - 2 = -14.$$

$$\text{Solve } 3x - 2 = 25: 3x = 27, \text{ so } x = 9.$$

$$f(x) = 3x - 2; f(-4) = -14; \text{ input } 9$$

Exercise 19 - Ball height

$$h(1) = -16 + 48 = 32, h(2) = -64 + 96 = 32, h(3) = -144 + 144 = 0.$$

Height is a function of time because each time has one height. The height 32 feet occurs at two different times (1 and 2 seconds), so time is not a function of height.

32, 32, 0; no

Exercise 20 - Taxi fare

Miles	Fare
8	\$16.50
10	\$20.00
11	\$21.75

Fares for 8, 10, and 11 miles.

$$F(8) = 2.50 + 1.75(8) = 2.50 + 14 = 16.50.$$

$$\text{Solve } 2.50 + 1.75m \leq 20: 1.75m \leq 17.5, \text{ so } m \leq 10.$$

\$16.50; 10 miles

Exercise 21 - Explain functions

(a) Each student has exactly one birth date, so it is a function.

(b) Two students can share a birth date, so one input can have several outputs.

(a) function; (b) not a function