

Algebra 1 · Building Functions and Inverses · Test

Common Core F-BF.A.1a, F-BF.A.1b, F-BF.B.4a, F-LE.A.1b · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This test has 9 questions worth 20 points in total and takes about 45 minutes. Write functions, combine them, find inverses of linear functions and interpret tables. Show every step, and include units in answers to word problems. No calculator is needed.

Test information

- **Grade:** Algebra 1
- **Chapter:** Building Functions and Inverses
- **Common Core:** F-BF.A.1a, F-BF.A.1b, F-BF.B.4a, F-LE.A.1b
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 2 pts; Question 6: 3 pts; Question 7: 3 pts; Question 8: 2 pts; Question 9: 1 pt)

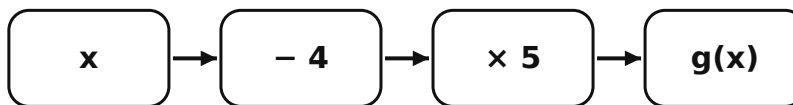
Question 1: Build from a situation (2 points)

Jamal rents a bike with a \$10 helmet fee plus \$6 per hour.

- Write an explicit function $f(h)$ for the cost of h hours. (1 point)
- Write a recursive rule for the same cost. (1 point)

Question 2: Steps of a function (2 points)

The diagram shows the steps that define a function g .



Steps for g .

- Write $g(x)$ as an expression. (1 point)

b. Find $g(9)$. (1 point)

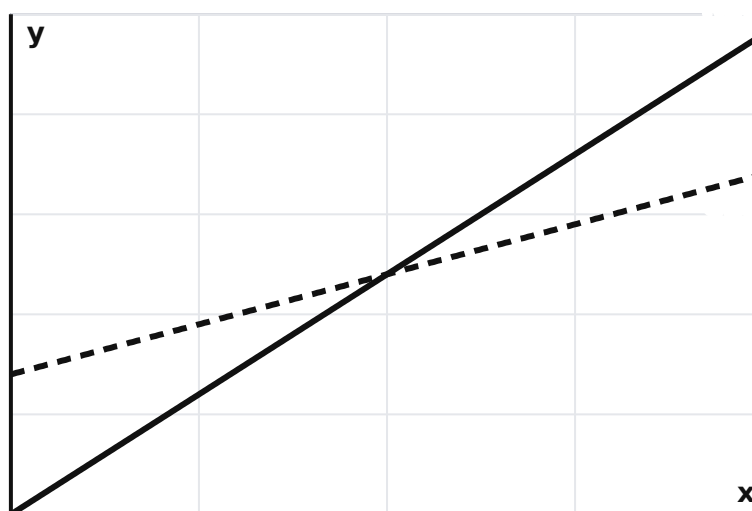
Question 3: Combine functions (2 points)

Let $f(x) = 4x + 1$ and $g(x) = x - 6$.

- a. Write $(f + g)(x)$. (1 point)
- b. Write $(f - g)(x)$ and find $(f - g)(3)$. (1 point)

Question 4: T-shirt profit (3 points)

The art club sells T-shirts. The graph shows revenue $R(x) = 12x$ and cost $C(x) = 5x + 140$ in dollars for x shirts.



Revenue (solid) and cost (dashed).

- a. Write the profit function $P(x)$. (1 point)
- b. Find the number of shirts needed to break even. (1 point)
- c. Find the profit for 35 shirts. (1 point)

Question 5: Solve $f(x) = c$ (2 points)

Let $f(x) = -3x + 14$.

- a. Solve $f(x) = 5$. (1 point)
- b. Solve $f(x) = -7$. (1 point)

Question 6: Inverse of a linear function (3 points)

Let $f(x) = \frac{2}{3}x + 4$.

- Write an expression for the inverse, giving x in terms of y . (2 points)
- Use it to find the input when the output is 10. (1 point)

Question 7: Water tank (3 points)

A water tank holds 150 gallons at time 0 and drains at 6 gallons per minute, so the water left is $W(t) = 150 - 6t$.

- Find the time when 90 gallons are left. (1 point)
- Write t in terms of W . (1 point)
- Find the time when the tank is empty. (1 point)

Question 8: Constant rate in a table (2 points)

Mei says the table shows a constant rate of change.

x	1	3	5	7
y	8	14	20	26

Values of x and y .

- Decide whether Mei is correct and justify the answer. (1 point)
- State the rate of change of y per 1 unit of x . (1 point)

Question 9: Check an inverse (1 point)

Let $f(x) = 2x + 3$ and $g(x) = \frac{x-3}{2}$. Find $g(f(5))$ and state what it shows.