

Algebra 1 · Building Functions and Inverses · Test Answer Key

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

Each solution is followed by a scoring guide. Award points for correct setup even if a later arithmetic slip occurs, but give no point for a final answer that has no supporting work. The total is 20 points.

Algebra 1 Common Core: F-BF.A.1a · F-BF.A.1b · F-BF.B.4a · F-LE.A.1b

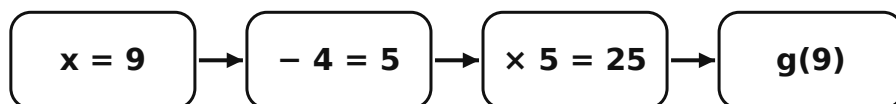
Question 1: Build from a situation (2 points)

- a. $f(h) = 6h + 10$.
- b. $f(0) = 10$ and $f(h) = f(h-1) + 6$.

Scoring: 1 point for the explicit rule with the correct rate and fee; 1 point for a correct start value and a repeated change of 6.

Question 2: Steps of a function (2 points)

- a. $g(x) = 5(x-4)$, with parentheses because the subtraction happens first.
- b. $g(9) = 5(9-4) = 25$.



Computation for $x = 9$.

Scoring: 1 point for the expression with the subtraction grouped; 1 point for the value 25.

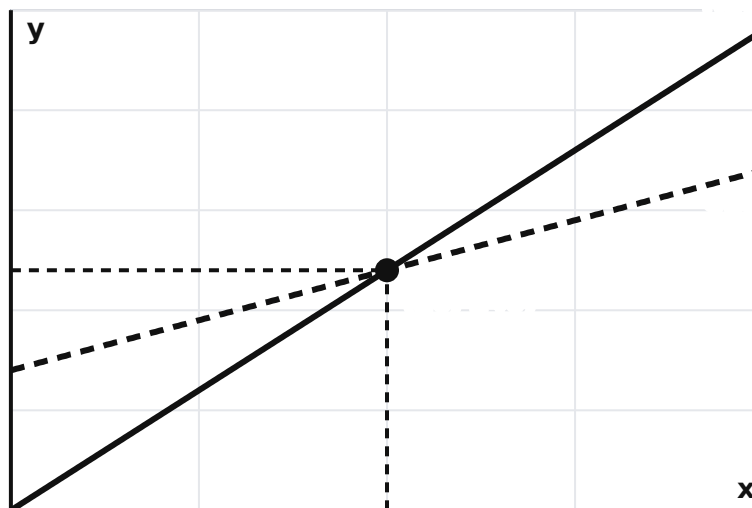
Question 3: Combine functions (2 points)

- a. $(f+g)(x) = 4x+1+x-6 = 5x-5$.
- b. $(f-g)(x) = 4x+1-(x-6) = 3x+7$ and $(f-g)(3) = 16$.

Scoring: 1 point for the sum; 1 point for the difference with the sign distributed and the correct value 16. Check: $f(3) = 13$, $g(3) = -3$, $13 - (-3) = 16$.

Question 4: T-shirt profit (3 points)

- $P(x) = 12x - (5x + 140) = 7x - 140$.
- $7x - 140 = 0$ gives $x = 20$ shirts.
- $P(35) = 7(35) - 140 = 105$, a profit of \$105.



The lines cross at (20, 240).

Scoring: 1 point per part; in (a) the whole cost must be subtracted.

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

- $-3x + 14 = 5$, so $-3x = -9$ and $x = 3$.
- $-3x + 14 = -7$, so $-3x = -21$ and $x = 7$.

Scoring: 1 point each for the correct value of x . Check: $f(3) = 5$, $f(7) = -7$.

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

- $y = \frac{2}{3}x + 4$, so $y - 4 = \frac{2}{3}x$ and $x = \frac{3}{2}(y - 4) = \frac{3}{2}y - 6$.
- $x = \frac{3}{2}(10 - 4) = 9$. Check: $f(9) = 6 + 4 = 10$.

Scoring: 1 point for isolating the term with x ; 1 point for multiplying by the reciprocal correctly; 1 point for the value 9.

Question 7: Water tank (3 points)

- $150 - 6t = 90$, so $6t = 60$ and $t = 10$ minutes.
- $6t = 150 - W$, so $t = \frac{150 - W}{6}$.
- $t = \frac{150 - 0}{6} = 25$ minutes.

Scoring: 1 point per part.

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

- a. Mei is correct: x rises by 2 and y rises by 6 in every step ($14-8=6$, $20-14=6$, $26-20=6$).
b. $\frac{6}{2}=3$ per 1 unit of x .

		+2	+2	+2	
		→	→	→	
x	1	3	5	7	
y	8	14	20	26	
		+6	+6	+6	
		→	→	→	

Equal steps give equal changes.

Scoring: 1 point for comparing equal x -steps with equal y -changes; 1 point for the rate 3.

Question 9: Check an inverse (1 point)

$f(5)=13$ and $g(13)=\frac{10}{2}=5$, the original input, which is consistent with g being the inverse of f .

Scoring: 1 point for the value 5 with a correct conclusion.

Total
20 points