

Building Functions from Real Situations

Grade 9 – Algebra 1 math · Test Answer Key · Standards: F-BF.A.1a, F-BF.A.1b, F-BF.B.4a, F-LE.A.1b

Use this answer key to score the test out of 20 points. Each solution lists where points are earned. Accept equivalent forms of a function, such as $8h + 15$ and $15 + 8h$.

Standards: F-BF.A.1a, F-BF.A.1b, F-BF.B.4a, F-LE.A.1b · **Level:** Grade 9 Algebra 1

Question 1 Plumber Rates (2 points)

a. $C(h) = 65 + 48h$.

b. $65 + 48(2.5) = 65 + 120 = \$185$.

Scoring: 1 point per part.

Question 2 Recursive to Explicit (2 points)

Each step subtracts 35, so $A(n) = 500 - 35n$.

$A(8) = 500 - 280 = 220$.

Scoring: 1 point for the explicit rule, 1 point for $A(8)$.

Question 3 Linear Table (2 points)

Rates: $(20 - 11) \div 3 = 3$ and $(32 - 20) \div 4 = 3$, a constant rate of 3 per unit.

Then $11 = 3(2) + b$ gives $b = 5$. $y = 3x + 5$.

Scoring: 1 point for showing the constant rate, 1 point for the rule.

Question 4 Combine Two Functions (3 points)

a. $2x^2 - x + 5x + 3 = 2x^2 + 4x + 3$.

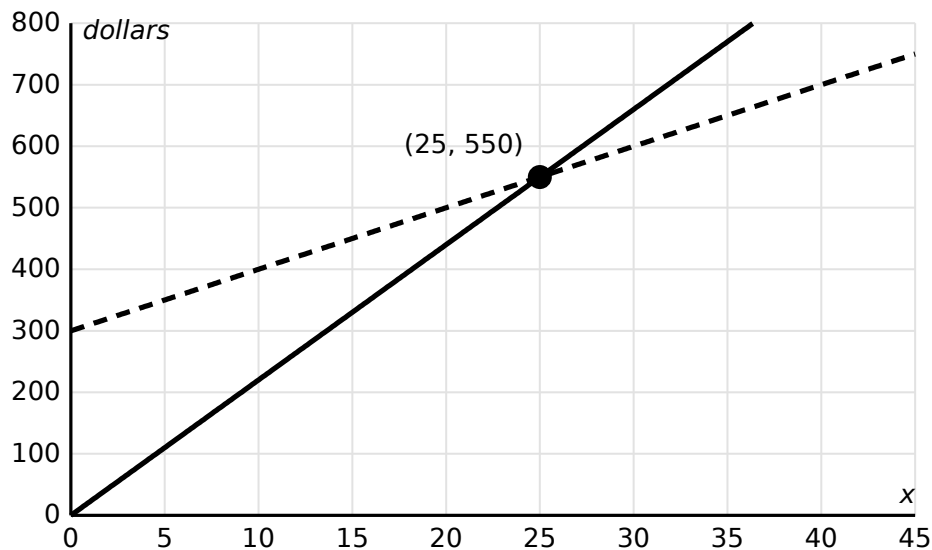
b. $2x^2 - x - 5x - 3 = 2x^2 - 6x - 3$.

c. $f(-1) = 3$ and $g(-1) = -2$, so the product is -6 .

Scoring: 1 point per part.

Question 5 Break-Even for a Bake Sale (3 points)

- a. $P(x) = 22x - (300 + 10x) = 12x - 300$.
- b. $12x - 300 = 0$ gives $x = 25$.
- c. $P(40) = 480 - 300 = \$180$.



Break-even at 25 items.

Scoring: 1 point per part.

Question 6 Inverse of a Linear Function (3 points)

- a. $y = 5x - 8$, so $x = \frac{(y+8)}{5}$. $f^{-1}(x) = \frac{(x+8)}{5}$.
- b. $f(3) = 7$ and $f^{-1}(7) = \frac{15}{5} = 3$ ✓.

Scoring: (a) 1 point for solving for x, 1 point for the inverse. (b) 1 point.

Question 7 Rental Hours (3 points)

- a. $R = 8h + 15$, so $h = \frac{(R-15)}{8}$. $h = \frac{(R-15)}{8}$.
- b. $\frac{(63-15)}{8} = \frac{48}{8} = 6$ hours.

Scoring: (a) 1 point for solving, 1 point for the function. (b) 1 point.

Question 8 Candle Height (2 points)

- a. The height changes by the same amount, **-0.75 inch**, every hour, a constant rate per unit interval. The slope means the candle shortens 0.75 inch each hour.
- b. $14 - 0.75(6) = 14 - 4.5 = 9.5$ inches.

Scoring: 1 point per part.