

Building Functions from Real Situations

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

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points. Allow 45 minutes and work without notes. A calculator is allowed. Show each step so that partial credit can be given for correct setups.

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

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Plumber Rates (2 points)

A plumber charges \$65 per visit plus \$48 per hour.

- Write a function $C(h)$ for the cost of a visit lasting h hours. (1 point)
- Find the cost of a 2.5-hour visit. (1 point)

Question 2 Recursive to Explicit (2 points)

A balance follows $A(0) = 500$ and $A(n) = A(n - 1) - 35$. Write an explicit rule and find $A(8)$.

Question 3 Linear Table (2 points)

A table gives $y = 11, 20, 32$ for $x = 2, 5, 9$. Show that y changes at a constant rate and write the rule.

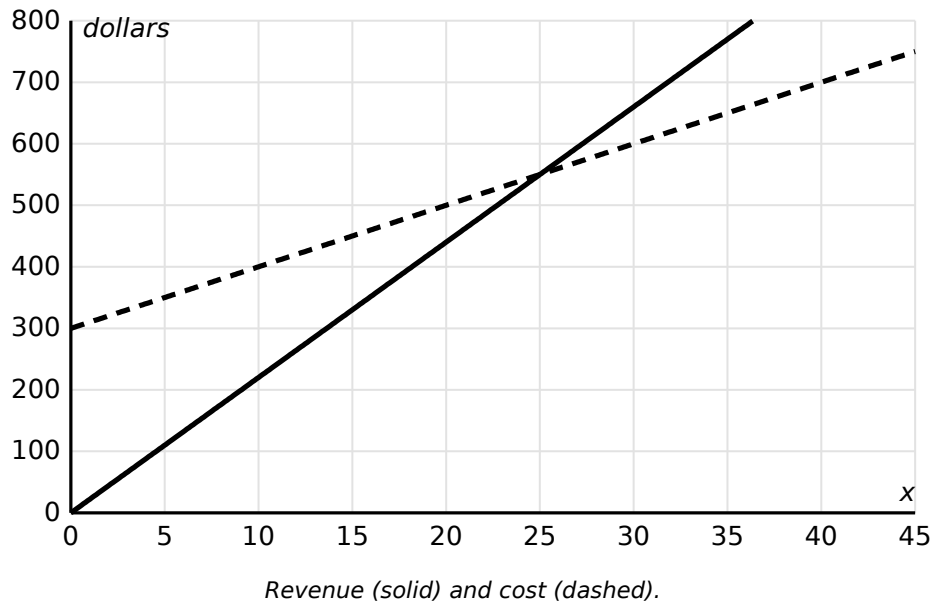
Question 4 Combine Two Functions (3 points)

Let $f(x) = 2x^2 - x$ and $g(x) = 5x + 3$.

- Find $(f + g)(x)$. (1 point)
- Find $(f - g)(x)$. (1 point)
- Find $(f \cdot g)(-1)$. (1 point)

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

A bake sale has revenue $R(x) = 22x$ and cost $C(x) = 300 + 10x$ dollars for x boxes. The graph shows both.



- Write the profit function. (1 point)
- Find the break-even number of boxes. (1 point)
- Find the profit for 40 boxes. (1 point)

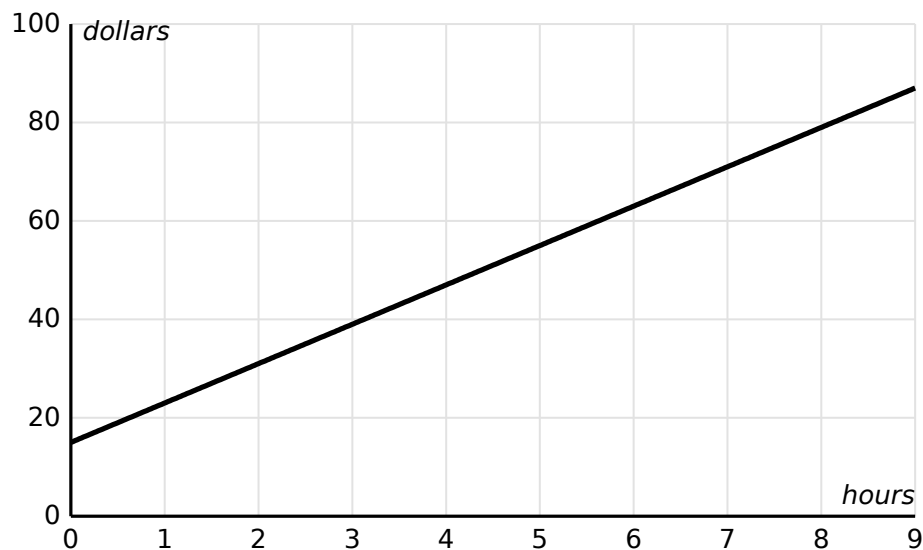
Question 6 Inverse of a Linear Function (3 points)

Let $f(x) = 5x - 8$.

- Find $f^{-1}(x)$. (2 points)
- Check your answer by computing $f^{-1}(f(3))$. (1 point)

Question 7 Rental Hours (3 points)

A bike rental costs $R(h) = 8h + 15$ dollars for h hours.



Rental cost for up to 9 hours.

- a. Find a function that gives the hours for a total cost R . (2 points)
- b. How many hours can a customer rent for \$63? (1 point)

Question 8 Candle Height (2 points)

A candle is 14 inches tall and burns down 0.75 inch per hour, so its height is $h(t) = 14 - 0.75t$.

- a. Explain why this is a linear function and interpret the slope. (1 point)
- b. Find the height after 6 hours. (1 point)