

Algebra 1 · Building Functions and Inverses · Worksheet

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

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

These 23 problems practice standards F-BF.A.1a, F-BF.A.1b, F-BF.B.4a and F-LE.A.1b. Start by writing functions from steps and recursive rules, then combine functions with sums, differences and products.

Next, solve $f(x) = c$ and write inverses of linear functions. Finish with word problems about profit, taxi fares, savings and gas tanks that mix several skills.

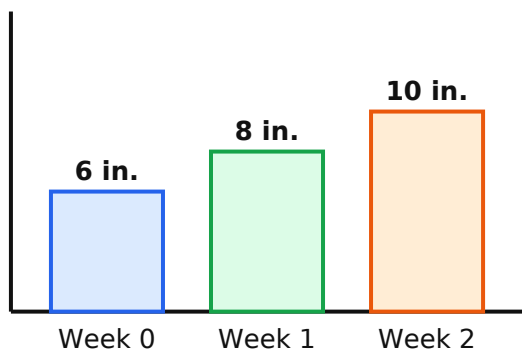
Algebra 1 Common Core: F-BF.A.1a · F-BF.A.1b · F-BF.B.4a · F-LE.A.1b

Problem 1: Steps to a function

Write a function f for this rule: multiply x by 4, then subtract 7. Then find $f(5)$.

Problem 2: Recursive growth

Ethan's bean plant is 6 inches tall in week 0 and grows 2 inches each week.



Heights for weeks 0, 1 and 2.

Write a recursive rule for the height $h(n)$ after n weeks, then find $h(4)$.

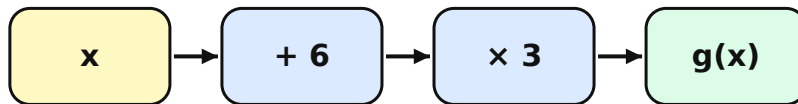
Problem 3: Recursive to explicit

A sequence is defined by $f(0)=5$ and $f(n)=f(n-1)+3$. Write an explicit rule for $f(n)$ and find

$f(10)$.

Problem 4: Order of the steps

Write a function g for the steps shown, then find $g(4)$.



Add 6 first, then multiply by 3.

Problem 5: Taxi fare function

A taxi charges a \$3 flat fee plus \$2.25 per mile. Write a function $c(m)$ for the cost of a ride of m miles, then find the cost of an 8-mile ride.

Problem 6: Sum of two functions

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

Problem 7: Difference of two functions

Let $f(x) = 5x - 1$ and $g(x) = 2x + 8$. Write $(f - g)(x)$ and find $(f - g)(6)$.

Problem 8: Product of two functions

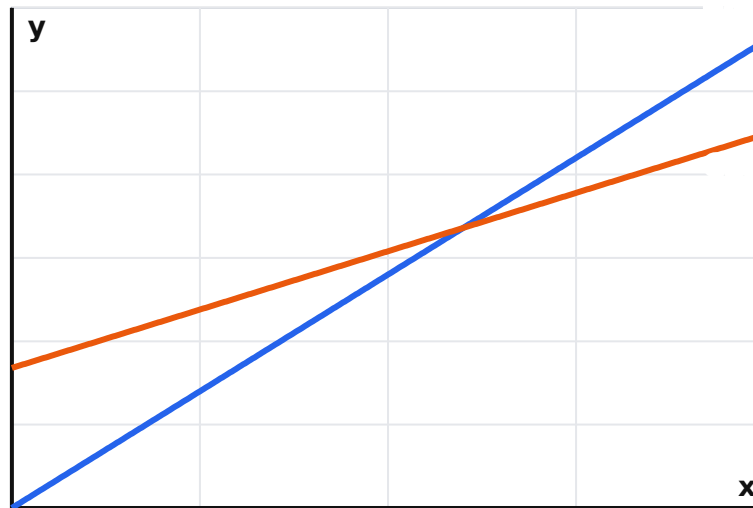
Let $f(x) = x + 3$ and $g(x) = 2x$. Write $(f \cdot g)(x)$ and find $(f \cdot g)(4)$.

Problem 9: Profit function

A club sells scarves. Revenue is $R(x) = 6x$ dollars and cost is $C(x) = 2x + 40$ dollars for x scarves. Write the profit function $P(x)$ and find the profit on 25 scarves.

Problem 10: Break-even from a graph

The school store sells hats. The graph shows revenue $R(x) = 7x$ and cost $C(x) = 3.5x + 84$ in dollars. Use the equations to find how many hats must be sold to break even, and the revenue at that point.



Revenue and cost for the hat sale.

Problem 11: Solve $f(x) = c$

For $f(x) = 3x - 4$, solve $f(x) = 20$ for x .

Problem 12: Inverse of a linear function

Let $f(x) = 5x + 10$. Solve $y = 5x + 10$ for x to write an expression for the inverse.

Problem 13: Inverse with a fraction

Let $f(x) = \frac{x}{4} + 6$. Write an expression for the inverse, then use it to find the input that gives $f(x) = 9$.

Problem 14: Check an inverse

Let $f(x) = 3x - 7$ and $g(x) = \frac{x+7}{3}$. Find $g(f(5))$ and $f(g(5))$. What do the results show about g ?

Problem 15: Is the rate constant?

Decide whether the table shows a constant rate of change. If it does, state the rate per 1 unit of x and write a function.

x	0	2	4	6
y	5	11	17	23

A table with x steps of 2.

Problem 16: Compare two tables

Which table changes at a constant rate per unit interval? Explain with the changes in y .

Table A: x	1	2	3	4
y	7	12	17	22

Table A.

Table B: x	1	2	3	4
y	3	6	12	24

Table B.

Problem 17: Temperature conversion

Fahrenheit temperature is $F(c) = 1.8c + 32$ for a Celsius temperature c . (a) Find the Celsius temperature when it is 68°F . (b) Write the inverse expression for c in terms of F .

Problem 18: Play ticket profit

Aisha sells play tickets for \$8 each. Costs are \$150 for the set plus \$1.25 per ticket for printing. Write $R(x)$, $C(x)$ and $P(x)$, then find the fewest tickets that give a profit.

Problem 19: Taxi fare inverse

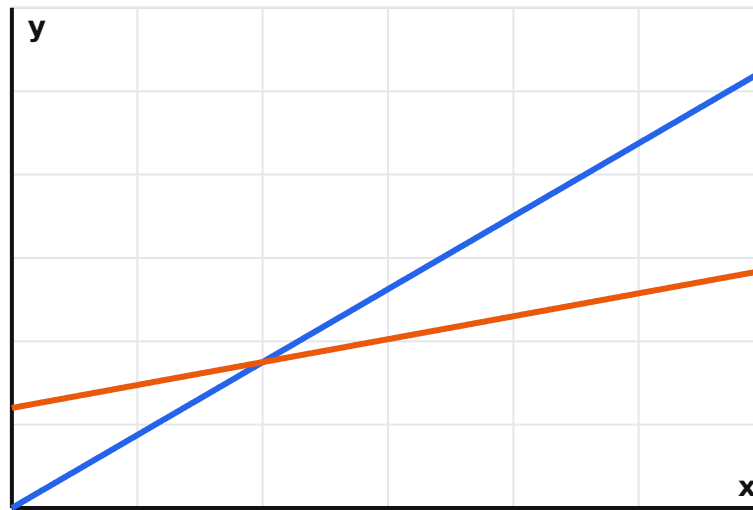
The taxi fare is $c(m) = 2.25m + 3$ dollars for m miles. Write m as a function of the cost c , then find how many miles Priya rode for a fare of \$25.50.

Problem 20: Savings recursion

Noah has \$45 saved and adds \$12 each week. Write a recursive rule and an explicit rule for the savings $S(n)$ after n weeks, then find after how many weeks he has \$165.

Problem 21: Hot dog stand profit

A Little League stand sells hot dogs for \$3.50 each. Each hot dog costs \$1.10 to make, and the cart rental is \$48. Write $P(x)$, find the break-even number of hot dogs, and find the profit for 50 hot dogs.



Revenue and cost for the hot dog stand.

Problem 22: Gas tank inverse

Diego starts a road trip with 14 gallons in the tank. The car uses 0.04 gallon per mile, so the gas left is $g(m) = 14 - 0.04m$. Write m in terms of g , then find the miles driven when 6 gallons are left and when the tank is empty.

Problem 23: Two classes combined

After x hours of a fundraiser, Ms. Lee's class has earned $L(x) = 4x - 20$ dollars and Mr. Cho's class has earned $C(x) = 6x - 35$ dollars. (a) Write the total $T(x)$. (b) After how many hours is the total \$145? (c) Write x in terms of T .