LESSON MAKER PRO

Function Connections

Read a representation, then write or use a rule.

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A2S.AF.F "Functions can be described by using a variety of representations: mapping diagrams, function notation (e.g., f(x) = x²), recursive definitions, tables, and graphs."

NAME _____ DATE _____

FROM VALUES TO RULES

In a linear function, equal changes in the input cause equal changes in the output. Use the change in output and one input-output pair to write a rule in function notation. A recursive rule gives a starting output and tells how to find each next output.

WORKED EXAMPLE

Use the table to write a linear rule for f(x).

x	f(x)
40	125
41	128
42	131

1. When x increases by 1, f(x) increases by 128 - 125 = 3.
2. Write f(x) = 3x + b.
3. Use (40, 125): 125 = 3(40) + b, so b = 5.

Answer: f(x) = 3x + 5

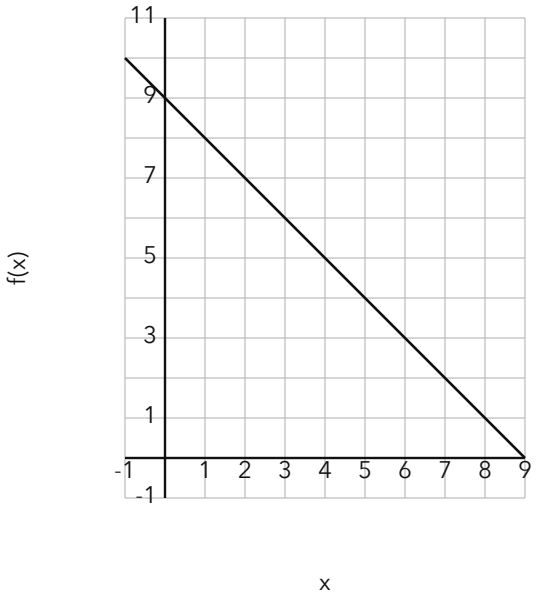
PRACTICE 6 problems

1 Use the table to write a linear rule for f(x).

x	f(x)
0	6
1	8
2	10

ANSWER _____

2 Write a rule for the function shown on the graph.



ANSWER _____

3 If f(x) = -2x + 14, find f(6).

ANSWER _____

4 The table shows a linear function. Find f(6).

x	f(x)
-2	14
0	10
2	6

ANSWER _____

5 For whole-number inputs, f(0) = 7 and f(x) = f(x - 1) + 4 when x is at least 1. Find f(6).

ANSWER _____

6 For f(x) = 4x - 6, which input has an output of 18?

ANSWER _____

APPLY IT Show your work

1 A music app charges $14 to join and $6 per month. Let f(x) be the total cost in dollars after x months. Write a rule for f(x), then find the cost after 7 months.

WORK SPACE

ANSWER _____

2 A phone battery starts at 92% and loses 8 percentage points per hour while streaming. Let f(x) be the battery percentage after x hours. Write a rule for f(x), then find when the battery reaches 28%.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The table shows two points on a linear function. Write its rule in function notation. Then write a recursive rule that starts at x = 0 and works for whole-number inputs.

x	f(x)
-2	18
6	-14

WORK SPACE AND ANSWER

ANSWER KEY

Function Connections

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the table to write a linear rule for f(x).	**f(x) = 2x + 6**
2	Write a rule for the function shown on the graph.	**f(x) = -x + 9**
3	If f(x) = -2x + 14, find f(6).	**2**
4	The table shows a linear function. Find f(6).	**-2**
5	For whole-number inputs, f(0) = 7 and f(x) = f(x - 1) + 4 when x is at least 1. Find f(6).	**31**
6	For f(x) = 4x - 6, which input has an output of 18?	**x = 6**

PART 2 · APPLY IT

1. **f(x) = 6x + 14; f(7) = $56** Add the joining charge to the monthly charge multiplied by the number of months: 6(7) + 14 = 56.
2. **f(x) = 92 - 8x; after 8 hours** Subtract 8 percentage points for each hour. Solve 92 - 8x = 28 to get x = 8.

CHALLENGE

f(x) = -4x + 10; f(0) = 10 and f(x) = f(x - 1) - 4 for whole-number x at least 1

Accept equivalent linear rules and equivalent recursive notation. In the challenge, the recursive rule must include both the starting value and the change between consecutive outputs.