LESSON MAKER PRO

Line Change Lab

Find how each rule changes a line.

GRADE 7 · 7A.AF.D.22

7A.AF.D.22 "Identify the effect on the graph of replacing f (x) by f (x) + k, k · f(x), f (kx), and f (x + k) for specific values of k (both positive and negative); find the value of k given the graphs..."

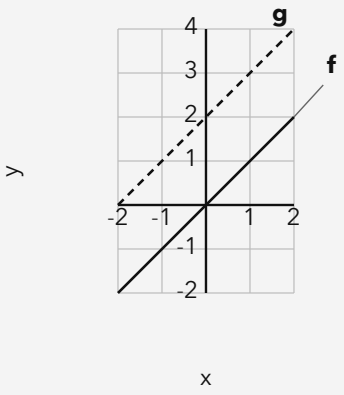
NAME _____ DATE _____

CHANGE THE RULE

For f(x) = mx + b, f(x) + k changes the y-intercept by k, while k · f(x) multiplies both the slope and y-intercept by k. In f(kx), multiply the slope by k. In f(x + k), add mk to the y-intercept.

WORKED EXAMPLE

The graph shows f and g. If g(x) = f(x) + k, find k.



1. Read the y-intercepts: f crosses at 0, and g crosses at 2.
2. Find the change: 2 - 0 = 2.

Answer: k = 2

PRACTICE 4 problems

1 If f(x) = 3x - 4, find g(x) = f(x) + (-6).

ANSWER _____

2 If f(x) = -4x + 6, find g(x) = -3 · f(x).

ANSWER _____

3 If f(x) = 5x - 7, find g(x) = f(-4x).

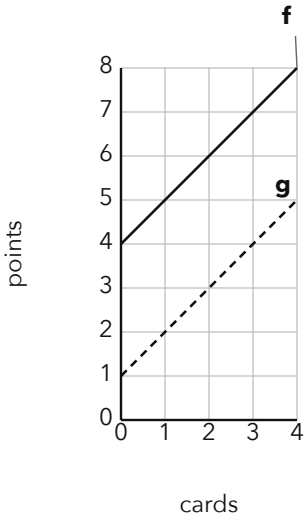
ANSWER _____

4 If f(x) = -3x + 8, find g(x) = f(x - 5).

ANSWER _____

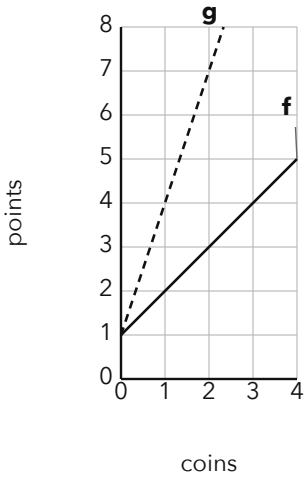
APPLY IT Show your work

1 A game awards points based on the number of cards you collect. The graph shows the old rule f and the new rule g. If g(x) = f(x) + k, find k. How did the points change?



ANSWER _____

2 Another game changes how it scores coins. The graph shows the old rule f and the new rule g, where g(x) = f(kx). Find k. How did the points per coin change?



ANSWER _____

CHALLENGE One step up

Let f(x) = -2x + 5. Find two different rules from f(x) + k, k · f(x), f(kx), and f(x + k) that both give g(x) = -2x - 1. State k for each rule and explain.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	If f(x) = 3x - 4, find g(x) = f(x) + (-6).	**g(x) = 3x - 10**
2	If f(x) = -4x + 6, find g(x) = -3 · f(x).	**g(x) = 12x - 18**
3	If f(x) = 5x - 7, find g(x) = f(-4x).	**g(x) = -20x - 7**
4	If f(x) = -3x + 8, find g(x) = f(x - 5).	**g(x) = -3x + 23**

PART 2 · APPLY IT

1. **k = -3; the new rule awards 3 fewer points for any number of cards.** The y-intercept changes from 4 to 1, so k = 1 - 4 = -3.
2. **k = 3; the points per coin increased from 1 to 3.** The slope changes from 1 to 3. Since f(kx) multiplies the slope by k, k = 3.

CHALLENGE

f(x) + k works with k = -6 because 5 - 6 = -1. f(x + k) works with k = 3 because -2(x + 3) + 5 = -2x - 1.

Accept equivalent simplified equations in Practice. In the Challenge, accept the two rules in either order.