LESSON MAKER PRO

Rates That Stay

Find and use constant rates of change.

HIGH SCHOOL · MT.CORE.ALG.LIN.1

MT.CORE.ALG.LIN.1 "Understand that linear functions have a constant rate of change."

NAME _____ DATE _____

THE BIG IDEA

A linear function changes at the same rate whenever x changes by the same amount. To find the rate, divide the change in the output by the change in x: (change in y)/(change in x). In a table, check more than one pair of rows to see whether the rate stays the same.

WORKED EXAMPLE

A linear function passes through (31, 94) and (37, 136). Find its constant rate of change.

1. Change in y: 136 - 94 = 42.
2. Change in x: 37 - 31 = 6.
3. Rate of change: 42/6 = 7.

Answer: 7

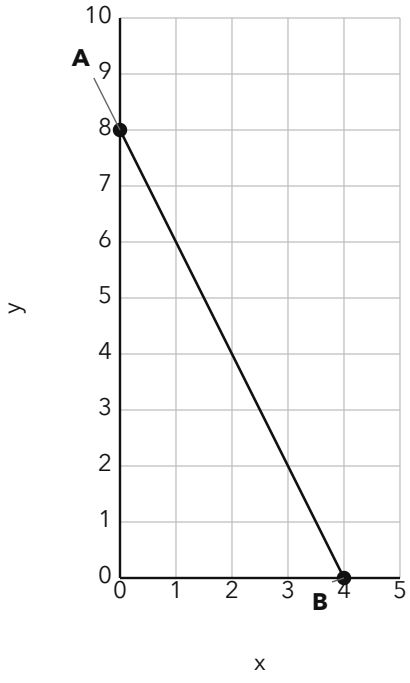
PRACTICE 6 problems

1 Find the constant rate of change shown in the table.

x	y
0	9
2	13
4	17

ANSWER _____

2 Find the rate of change of the line.



ANSWER _____

3 Find the constant rate of change of y = -4x + 9.

ANSWER _____

4 The x-values in this table do not increase by equal amounts. Find the constant rate of change.

x	y
1	2
3	8
8	23

ANSWER _____

5 Does the table show a linear function? Use the rates between rows to explain.

x	y
0	1
2	5
4	11

ANSWER _____

_____

6 A linear function passes through (-2, 9) and (2, 3). Find its constant rate of change.

ANSWER _____

APPLY IT Show your work

1 A playlist has downloaded 18 MB after 1 minute and 50 MB after 5 minutes. If the amount downloaded changes at a constant rate, what is the download rate in MB per minute?

WORK SPACE

ANSWER _____

2 Your phone battery is at 84% after 1 hour of streaming and 56% after 3 hours. If the battery level falls at a constant rate, what will it be after 5 hours?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A linear function has the points (-3, 21), (1, 5), and (9, y). Find y and explain how the constant rate supports your answer.

WORK SPACE AND ANSWER

Rates That Stay

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the constant rate of change shown in the table.	**2**
2	Find the rate of change of the line.	**-2**
3	Find the constant rate of change of y = -4x + 9.	**-4**
4	The x-values in this table do not increase by equal amounts. Find the constant rate of change.	**3**
5	Does the table show a linear function? Use the rates between rows to explain.	**No. The rates are (5 - 1)/(2 - 0) = 2 and (11 - 5)/(4 - 2) = 3, so the rate is not constant.**
6	A linear function passes through (-2, 9) and (2, 3). Find its constant rate of change.	**-3/2**

PART 2 · APPLY IT

1. **8 MB per minute** Divide the increase in downloaded data by the elapsed time: (50 - 18)/(5 - 1) = 8 MB per minute.
2. **28%** The rate is (56 - 84)/(3 - 1) = -14 percentage points per hour. Two hours after the 3-hour reading, the battery level is 56% - 28% = 28%.

CHALLENGE

The rate from (-3, 21) to (1, 5) is (5 - 21)/(1 - (-3)) = -4. From x = 1 to x = 9, the output changes by -4(8) = -32, so y = 5 - 32 = -27.

Accept equivalent calculations of change in y divided by change in x. For the battery problem, distinguish a change of 14 percentage points per hour from a 14% proportional decrease.