LESSON MAKER PRO

Find the Starting Point

Build linear functions from points and real situations.

GRADE 8 · 8.AF.E.16

8.AF.E.16 "Construct a function to model a linear relationship between two variables. a. Interpret the rate of change (slope) and initial value of the linear function from a description of a relationship or from two points in a table or graph."

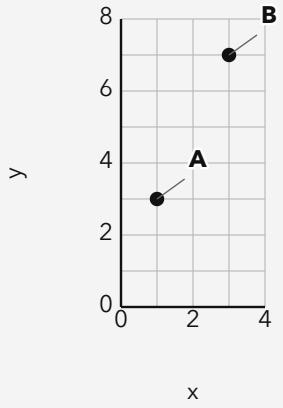
NAME _____ DATE _____

RATE AND START

A linear function can be written as y = mx + b. Find the rate m by dividing the change in y by the change in x. The initial value b is the value of y when x = 0.

WORKED EXAMPLE

Use the plotted points to write y as a function of x. What do the rate and initial value mean?



1. Rate: (7 - 3)/(3 - 1) = 2.
2. Use (1, 3): 3 = 2(1) + b, so b = 1.
3. Write y = 2x + 1.

Answer: The rate is 2, so y increases by 2 when x increases by 1. The initial value is 1, so y = 1 when x = 0.

PRACTICE 4 problems

1 When x = 0, y = 8. Each increase of 1 in x adds 3 to y. Write y as a function of x.

ANSWER _____

2 A linear function includes (2, 13) and (4, 19). Find its rate and initial value.

ANSWER _____

3 For y = -2x + 12, what happens to y when x increases by 1? What is y when x = 0?

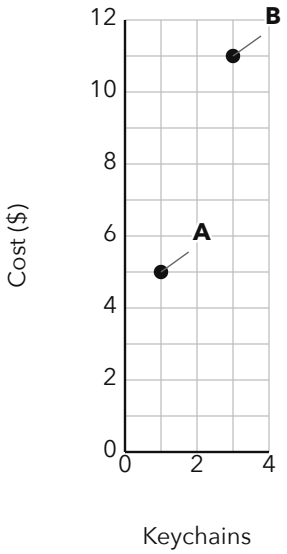
ANSWER _____

4 A linear function includes (3, 11) and (5, 15). Write y as a function of x.

ANSWER _____

APPLY IT Show your work

1 A shop charges for custom keychains. The graph shows the total cost y for x keychains. Write y as a function of x. What are the cost per keychain and the starting charge?



ANSWER _____

2 You earn a fixed bonus plus pay for each game clip you edit. The table shows your total pay y for x clips. Write y as a function of x. What is the bonus?

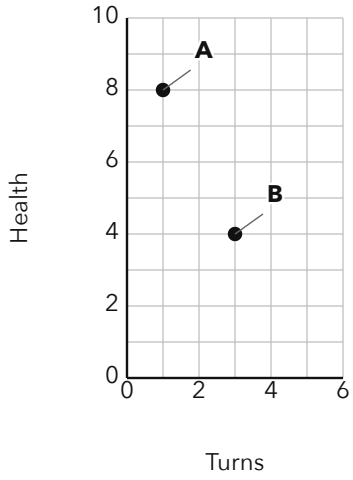
EDITING PAY

Clips, x	Total pay, y ($)
2	9
4	17
6	25

ANSWER _____

CHALLENGE One step up

A game character loses health at a steady rate. The graph shows health H after x turns. Write H as a function of x. On which turn will health reach 0? Explain.



WORK SPACE AND ANSWER

ANSWER KEY

Find the Starting Point

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	When x = 0, y = 8. Each increase of 1 in x adds 3 to y. Write y as a function of x.	**y = 3x + 8**
2	A linear function includes (2, 13) and (4, 19). Find its rate and initial value.	**Rate: 3; initial value: 7.**
3	For y = -2x + 12, what happens to y when x increases by 1? What is y when x = 0?	**y decreases by 2; y = 12 when x = 0.**
4	A linear function includes (3, 11) and (5, 15). Write y as a function of x.	**y = 2x + 5**

PART 2 · APPLY IT

1. **y = 3x + 2; each keychain costs $3, and the starting charge is $2.** The cost rises by $6 for 2 more keychains, so the rate is $3 per keychain. Substituting (1, 5) gives a starting charge of $2.
2. **y = 4x + 1; the bonus is $1.** Pay rises by $8 for 2 more clips, so the rate is $4 per clip. Substituting (2, 9) gives a $1 bonus.

CHALLENGE

H = -2x + 10. Health drops by 2 each turn, so -2x + 10 = 0 when x = 5. Health reaches 0 on turn 5.

Accept equivalent function forms. For interpretations, look for units and a clear statement of what happens when x increases by 1 or equals 0.