LESSON MAKER PRO

Find the Function

Build linear models from graphs, tables, and real situations.

GRADE 8 · 8.AT.D.10

8.AT.D.10 "Construct and interpret a linear function to model a relationship between two quantities. Given two input-output pairs, a graph, a table, or a description of a relationship..."

NAME _____ DATE _____

RATE AND STARTING VALUE

A linear function has the form y = mx + b. Find the rate m by dividing the change in output by the change in input, then use one input-output pair to find the initial value b.

WORKED EXAMPLE

Use the table to find the rate of change and initial value. Then write the equation.

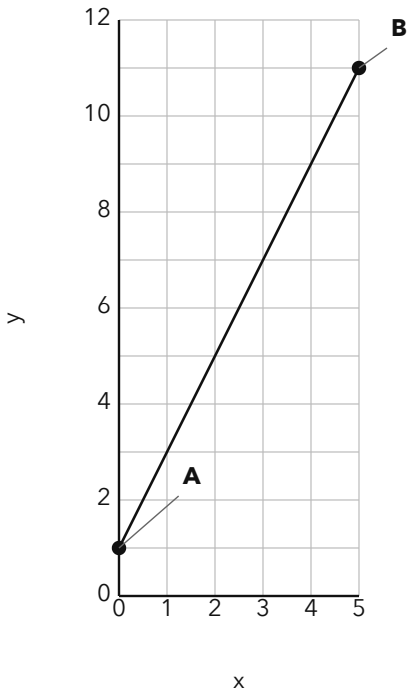
x	y
4	18
9	33

1. Rate: m = (33 - 18)/(9 - 4) = 15/5 = 3.
2. Use (4, 18): 18 = 3(4) + b.
3. Solve: b = 6. Write y = 3x + 6.

Answer: Rate: 3; initial value: 6; equation: y = 3x + 6.

PRACTICE 6 problems

1 Use the graphed line to find the rate of change and initial value. Write its equation.



ANSWER _____

_____

2 The table shows how many songs remain on a playlist after x days. Write an equation for y, the songs remaining. Explain what the rate and initial value mean.

SONGS REMAINING

Days, x	Songs, y
0	12
2	10
5	7

ANSWER _____

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3 A linear function includes the pairs (1, 16) and (5, 24). Find its rate of change and initial value. Write its equation.

ANSWER _____

_____

4 You start with 15 stickers and give away 2 each day. Let x be days and y be stickers left. Write an equation, then state what its rate of change and initial value mean.

ANSWER _____

_____

5 A linear function includes the pairs (1, 0) and (5, 20). Find its rate of change and initial value. Write its equation.

ANSWER _____

_____

6 A line has a rate of change of -2 and passes through (5, 1). Find its initial value and write its equation.

ANSWER _____

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APPLY IT Show your work

1 A skate park charges a $13 entry fee plus $2 for each hour you skate. Let x be hours and y be the total cost in dollars. Write a linear equation and explain what its rate and initial value mean.

WORK SPACE

ANSWER _____

2 While a tablet streams video, its battery is at 18% after 1 hour and 10% after 5 hours. Let x be hours of streaming and y be battery percentage. Write a linear model and interpret its rate and initial value.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two gaming teams earn points at steady rates. Team A's score follows the table. Team B starts with 22 points and gains 1 point each round. Let x be rounds played and y be total points. Write an equation for each team. At which round will their scores match? Explain how you know.

TEAM A

Rounds, x	Points, y
0	14
2	20

WORK SPACE AND ANSWER

ANSWER KEY

Find the Function

GRADE 8 · 8.AT.D.10

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the graphed line to find the rate of change and initial value. Write its equation.	**Rate: 2; initial value: 1; y = 2x + 1.**
2	The table shows how many songs remain on a playlist after x days. Write an equation for y, the songs remaining. Explain what the rate and initial value mean.	**y = 12 - x. The playlist starts with 12 songs and loses 1 song each day.**
3	A linear function includes the pairs (1, 16) and (5, 24). Find its rate of change and initial value. Write its equation.	**Rate: 2; initial value: 14; y = 2x + 14.**
4	You start with 15 stickers and give away 2 each day. Let x be days and y be stickers left. Write an equation, then state what its rate of change and initial value mean.	**y = 15 - 2x. You start with 15 stickers and lose 2 stickers per day.**
5	A linear function includes the pairs (1, 0) and (5, 20). Find its rate of change and initial value. Write its equation.	**Rate: 5; initial value: -5; y = 5x - 5.**
6	A line has a rate of change of -2 and passes through (5, 1). Find its initial value and write its equation.	**Initial value: 11; y = -2x + 11.**

PART 2 · APPLY IT

1. **y = 2x + 13. The cost rises by $2 per hour, and the entry fee is $13 before any skating time is added.** The hourly charge is the rate, 2 dollars per hour. The entry fee is the initial value, 13 dollars.
2. **y = 20 - 2x. The battery drops by 2 percentage points per hour and was at 20% when streaming began.** The rate is (10 - 18)/(5 - 1) = -2 percentage points per hour. Substitute (1, 18) to get an initial value of 20%.

CHALLENGE

Team A: y = 3x + 14. Team B: y = x + 22. Their scores match after 4 rounds because 3(4) + 14 = 4 + 22 = 26.

Accept equivalent equation forms and equivalent wording for contextual interpretations. In the challenge, accept solving 3x + 14 = x + 22 or checking both scores at x = 4.