LESSON MAKER PRO

Find the Function

Build linear rules from data and explain what they mean.

GRADE 8 · MT.8.F.4

MT.8.F.4 "Given linear data relating two quantities, construct a linear function that models the data and interpret the rate of change and initial value of a linear function in terms of the situation it models."

NAME _____ DATE _____

FROM DATA TO RULE

For a linear function, divide the change in y by the change in x to find the rate m. Use y = mx + b and one data pair to find b, the value of y when x = 0.

WORKED EXAMPLE

A skate park charges a sign-up fee plus a cost for each pass. The table shows the total cost y for x passes. Write a rule and explain its rate and initial value.

Passes (x)	Cost in dollars (y)
4	27
9	47

1. m = (47 - 27)/(9 - 4) = 4.
2. 27 = 4(4) + b, so b = 11.
3. The rule is y = 4x + 11.

Answer: Each pass costs $4. The sign-up fee is $11.

PRACTICE 4 problems

1 A linear function contains (1, 8) and (3, 18). Write its rule as y = mx + b.

ANSWER _____

2 A song collection has 6 tracks at week 0 and 12 tracks at week 2. Write a rule for y tracks after x weeks. What does the initial value mean?

ANSWER _____

3 A tank has 15 liters of water after 1 minute and 11 liters after 3 minutes. Write a rule for y liters after x minutes. Explain the rate.

ANSWER _____

_____

4 For a linear function, y is 16 when x is 2, and y is 28 when x is 6. Write the rule and find y when x is 8.

ANSWER _____

_____

APPLY IT Show your work

1 A gaming club adds money to its prize fund each week. Use the table to write a rule for the fund y after x weeks. Explain the rate and starting amount.

PRIZE FUND

Weeks (x)	Dollars (y)
1	18
5	42

ANSWER _____

2 A phone's battery drops steadily. It is at 86% after 1 hour and 62% after 3 hours. Write a rule for its battery percentage y after x hours. Explain the rate and initial value.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two streaming plans have costs that grow at steady rates. Use the table to write a cost rule for each plan. In which month do the costs match, and what is the cost?

STREAMING COSTS

Months (x)	Plan A ($)	Plan B ($)
1	14	17
5	30	29

WORK SPACE AND ANSWER

ANSWER KEY

Find the Function

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A linear function contains (1, 8) and (3, 18). Write its rule as y = mx + b.	**y = 5x + 3**
2	A song collection has 6 tracks at week 0 and 12 tracks at week 2. Write a rule for y tracks after x weeks. What does the initial value mean?	**y = 3x + 6. The collection started with 6 tracks.**
3	A tank has 15 liters of water after 1 minute and 11 liters after 3 minutes. Write a rule for y liters after x minutes. Explain the rate.	**y = -2x + 17. The tank loses 2 liters per minute.**
4	For a linear function, y is 16 when x is 2, and y is 28 when x is 6. Write the rule and find y when x is 8.	**y = 3x + 10; y = 34 when x = 8.**

PART 2 · APPLY IT

1. **y = 6x + 12. The fund grows by $6 per week and started with $12.** The rate is (42 - 18)/(5 - 1) = 6 dollars per week. Using (1, 18) gives a starting amount of 18 - 6 = 12 dollars.
2. **y = -12x + 98. The battery drops 12 percentage points per hour and started at 98%.** The rate is (62 - 86)/(3 - 1) = -12 percentage points per hour. Using (1, 86) gives an initial value of 86 + 12 = 98%.

CHALLENGE

Plan A: y = 4x + 10. Plan B: y = 3x + 14. The costs match in month 4 at $26.

Accept equivalent rules and descriptions of a negative rate as a decrease. In the challenge, x = 4 means the cost after 4 months.