LESSON MAKER PRO

Find the Starting Point

Build a linear rule from two points.

GRADE 7 · 7A.AF.D.23

7A.AF.D.23 "Construct a function to model the 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 from two points in a table or graph."

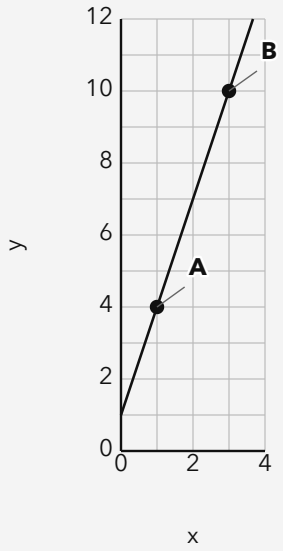
NAME _____ DATE _____

SLOPE AND START

Find the slope by dividing the change in y by the change in x. Put one point into y = mx + b to find b. The slope tells how much y changes when x increases by 1, and b is the value of y when x = 0.

WORKED EXAMPLE

Use points A and B on the graph to write a rule in the form y = mx + b. Identify the slope and initial value.

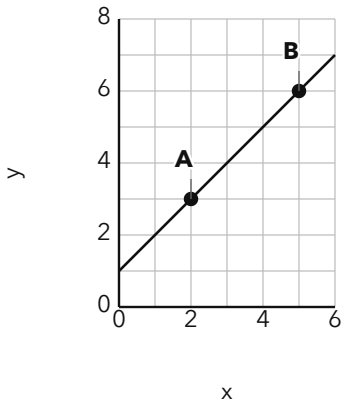


1. Slope = (10 - 4)/(3 - 1) = 6/2 = 3.
2. Use point A: 4 = 3(1) + b, so b = 1.
3. Write the rule: y = 3x + 1.

Answer: y = 3x + 1; slope = 3; initial value = 1.

PRACTICE 6 problems

1 Use points A and B on the graph to write y = mx + b. State the slope and initial value.



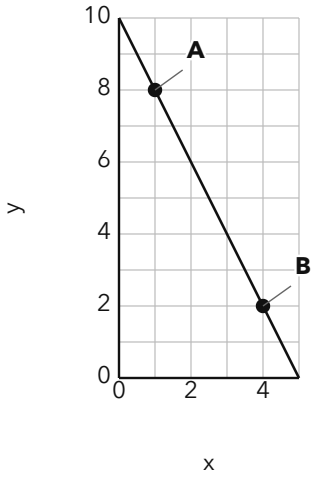
ANSWER _____

2 Use the table to write a rule in the form y = mx + b.

x	y
5	17
8	23

ANSWER _____

3 Use points A and B on the graph to write y = mx + b. How does y change when x increases by 1?



ANSWER _____

4 Use the table to write a rule in the form y = mx + b.

x	y
3	14
6	8

ANSWER _____

5 A line passes through (-2, -1) and (2, 7). Write y = mx + b, and state its initial value.

ANSWER _____

6 A tank has 31 liters of water after 3 minutes and 19 liters after 7 minutes. Write a rule for y liters after x minutes. Explain what the slope and initial value mean.

ANSWER _____

APPLY IT Show your work

1 At an arcade, your card has 42 credits left after 2 games and 30 credits left after 5 games. Let x be the number of games played and y be the credits left. Write a linear rule. Explain its slope and initial value, then find how many credits remain after 8 games.

WORK SPACE

ANSWER _____

2 A student tracks a new video channel. It has 82 followers after 3 weeks and 110 followers after 7 weeks. Let x be the number of weeks and y be the followers. Write a linear model, explain its slope and initial value, and predict the number of followers after 10 weeks.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A tablet has 73% battery after 2 hours of use and 58% after 5 hours. Assume the battery percentage changes at a constant rate. Write a model for y, the battery percentage after x hours. What is the first whole number of hours when the model predicts less than 40%? Explain why the previous whole hour does not work.

WORK SPACE AND ANSWER

ANSWER KEY

Find the Starting Point

GRADE 7 · 7A.AF.D.23

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use points A and B on the graph to write y = mx + b. State the slope and initial value.	**y = x + 1; slope = 1; initial value = 1.**
2	Use the table to write a rule in the form y = mx + b.	**y = 2x + 7.**
3	Use points A and B on the graph to write y = mx + b. How does y change when x increases by 1?	**y = -2x + 10. The value of y decreases by 2 when x increases by 1.**
4	Use the table to write a rule in the form y = mx + b.	**y = -2x + 20.**
5	A line passes through (-2, -1) and (2, 7). Write y = mx + b, and state its initial value.	**y = 2x + 3; initial value = 3.**
6	A tank has 31 liters of water after 3 minutes and 19 liters after 7 minutes. Write a rule for y liters after x minutes. Explain what the slope and initial value mean.	**y = -3x + 40. The tank loses 3 liters each minute and started with 40 liters.**

PART 2 · APPLY IT

1. **y = -4x + 50. Each game costs 4 credits, and the card started with 50 credits. After 8 games, 18 credits remain.** The change is -12 credits over 3 games, so the slope is -4. Substitute (2, 42) to get an initial value of 50, then use x = 8.
2. **y = 7x + 61. The model gains 7 followers per week and starts with 61 followers. It predicts 131 followers after 10 weeks.** The follower count rises by 28 over 4 weeks, so the slope is 7. Substitute (3, 82) to find an initial value of 61, then use x = 10.

CHALLENGE

y = -5x + 83. The first whole number of hours is 9: the model predicts 38% then. At 8 hours, it predicts 43%, which is not less than 40%.

Accept equivalent linear equations and clear descriptions of a negative slope as a decrease. For the challenge, the first whole number of hours must be 9.