LESSON MAKER PRO

Find the Starting Point

Use a rate and a starting value to model a line.

GRADE 8 · 8.AT.D.10.a

8.AT.D.10.a "Given two input-output pairs, a graph, a table, or a description of a relationship, determine the rate of change and initial value and write the linear equation that models the situation."

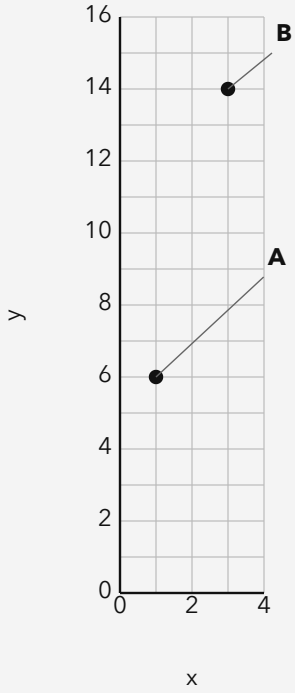
NAME _____ DATE _____

RATE AND INITIAL VALUE

The rate of change is the change in y divided by the change in x. The initial value is y when x is 0. Use y = mx + b, where m is the rate and b is the initial value.

WORKED EXAMPLE

Use points A and B on the graph to find the rate of change and initial value. Write the equation of the line through them.

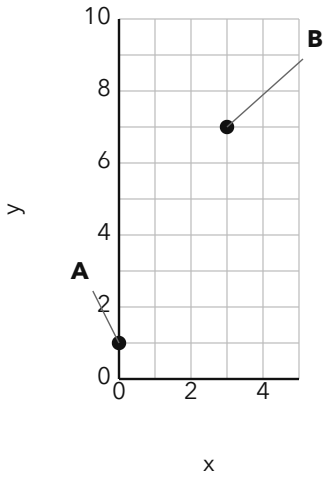


1. From A to B, y increases by 8 while x increases by 2.
2. The rate of change is 8/2 = 4.
3. Using A, 6 = 4(1) + b, so b = 2.

Answer: Rate of change: 4. Initial value: 2. Equation: y = 4x + 2.

PRACTICE 6 problems

1 Use the plotted points to find the rate of change and initial value. Write the equation of the line through them.



ANSWER _____

2 Use the table to find the rate of change and initial value. Write the linear equation.

INPUT AND OUTPUT

x	y
-2	-7
0	-3
3	3

ANSWER _____

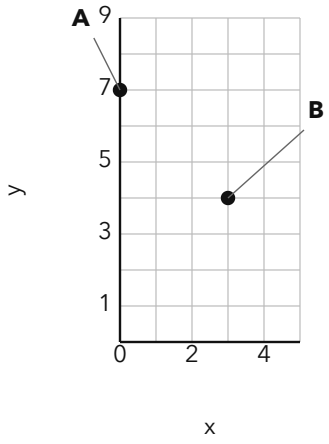
3 Use the table to find the rate of change and initial value. Write the linear equation.

INPUT AND OUTPUT

x	y
1	9
4	3
7	-3

ANSWER _____

4 Use the plotted points to find the rate of change and initial value. Write the equation of the line through them.



ANSWER _____

5 A line passes through (2, 13) and (5, 28). Find its rate of change and initial value. Write its equation.

ANSWER _____

6 Each time x increases by 2, y decreases by 5. When x = 2, y = 3. Find the rate of change and initial value. Write the equation.

ANSWER _____

APPLY IT Show your work

1 An arcade card costs $6 to activate, plus $2 for each game played. Let x be the number of games and y be the total cost in dollars. Find the rate of change and initial value. Write an equation for y.

WORK SPACE

ANSWER _____

2 A print shop charges $16 for 2 custom laptop stickers and $25 for 5 stickers. Let x be the number of stickers and y be the total cost in dollars. The cost follows a linear model. Find the rate of change and initial value. Write an equation for y.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Nico says the initial value in the table is 6 because that value appears in the y column. Explain the mistake, then find the rate of change, initial value, and equation.

INPUT AND OUTPUT

x	y
-3	14
1	6
5	-2

WORK SPACE AND ANSWER

ANSWER KEY

Find the Starting Point

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the plotted points to find the rate of change and initial value. Write the equation of the line through them.	**Rate of change: 2. Initial value: 1. Equation: y = 2x + 1.**
2	Use the table to find the rate of change and initial value. Write the linear equation.	**Rate of change: 2. Initial value: -3. Equation: y = 2x - 3.**
3	Use the table to find the rate of change and initial value. Write the linear equation.	**Rate of change: -2. Initial value: 11. Equation: y = -2x + 11.**
4	Use the plotted points to find the rate of change and initial value. Write the equation of the line through them.	**Rate of change: -1. Initial value: 7. Equation: y = -x + 7.**
5	A line passes through (2, 13) and (5, 28). Find its rate of change and initial value. Write its equation.	**Rate of change: 5. Initial value: 3. Equation: y = 5x + 3.**
6	Each time x increases by 2, y decreases by 5. When x = 2, y = 3. Find the rate of change and initial value. Write the equation.	**Rate of change: -5/2. Initial value: 8. Equation: y = -5/2x + 8.**

PART 2 · APPLY IT

1. **Rate of change: $2 per game. Initial value: $6. Equation: y = 2x + 6.** Each game adds $2 to the cost, so the rate is 2. The $6 activation fee is the cost when no games have been played.
2. **Rate of change: $3 per sticker. Initial value: $10. Equation: y = 3x + 10.** The cost rises by $9 for 3 more stickers, so the rate is $3 per sticker. At 2 stickers, 16 = 3(2) + b, giving an initial value of $10.

CHALLENGE

The value 6 is the output when x = 1, not when x = 0. The rate of change is -2, so the initial value is 8 and the equation is y = -2x + 8.

Accept equivalent equation forms that clearly show the same relationship. For the challenge, the explanation must distinguish the output at x = 1 from the initial value at x = 0.