LESSON MAKER PRO

Start and Change

Connect a line's equation to its rate and starting value.

HIGH SCHOOL · MT.CORE.ALG.LIN.4.c

MT.CORE.ALG.LIN.4.c "Understand that linear equations can be represented in multiple forms and the specific features of each form by: Understanding the relationship between slope-intercept form, the rate of change, and the initial value,"

NAME _____ **DATE** _____

THE BIG IDEA

In y = mx + b, m is the rate of change and b is the value of y when x = 0. From a table, divide the change in y by the change in x to find m, then find b.

WORKED EXAMPLE

Find the rate, initial value, and equation for this line.

x	y
0	13
2	19

1. Rate = (19 - 13)/(2 - 0) = 3.
2. At x = 0, y = 13, so the initial value is 13.
3. Write y = 3x + 13.

Answer: Rate: 3; initial value: 13; equation: y = 3x + 13

PRACTICE 4 problems

1 For y = -4x + 7, find the rate and initial value.

ANSWER _____

2 A line has a rate of 6 and an initial value of -1. Write its equation.

ANSWER _____

3 A line passes through (0, -8) and (4, 12). Write its equation.

ANSWER _____

4 For y = -5/6x + 11, how does y change when x increases by 12?

ANSWER _____

APPLY IT Show your work

1 A game rental costs $8 to start and $6 per week. Write an equation for total cost y after x weeks. State the rate and initial value.

WORK SPACE

ANSWER _____

2 A phone charges at a steady rate. Use the table to write its battery percent y after x minutes. State the rate and starting percent.

PHONE CHARGING

Minutes (x)	Battery percent (y)
0	24
10	32

ANSWER _____

CHALLENGE One step up

Two fundraisers have totals A = 8x + 48 and B = 14x + 12 dollars after x sales. Which starts higher, which grows faster, and after how many sales are the totals equal?

WORK SPACE AND ANSWER

Start and Change

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For y = -4x + 7, find the rate and initial value.	**Rate: -4; initial value: 7**
2	A line has a rate of 6 and an initial value of -1. Write its equation.	**y = 6x - 1**
3	A line passes through (0, -8) and (4, 12). Write its equation.	**y = 5x - 8**
4	For y = -5/6x + 11, how does y change when x increases by 12?	**y decreases by 10.**

PART 2 · APPLY IT

1. **y = 6x + 8; rate: $6 per week; initial value: $8** The weekly cost is the rate. The starting fee is the cost at zero weeks.
2. **y = 4/5x + 24; rate: 4/5 percentage point per minute; starting percent: 24%** The battery gains 8 percentage points in 10 minutes, so the rate is 8/10 = 4/5 per minute. At zero minutes, it is at 24%.

CHALLENGE

A starts higher by $36. B grows faster by $6 per sale. The totals are equal after 6 sales, when each has $96.

Accept equivalent equations and rates. For the challenge, students may solve 8x + 48 = 14x + 12 or compare the $36 starting gap with the $6 difference per sale.