LESSON MAKER PRO

Start and Change

Find what stays constant and where a line begins.

GRADE 8 · 8.F.4a

8.F.4a "Apply the concepts of linear functions to real-world and mathematical situations. Understand that the slope is the constant rate of change and the y-intercept is the point where x = 0."

NAME _____ DATE _____

SLOPE AND STARTING VALUE

For a linear function, slope is the change in y divided by the change in x between any two points. The y-intercept is the point (0, b), where b is the value of y when x = 0. In y = mx + b, m is the slope.

WORKED EXAMPLE

A game account has 12 points at week 0 and 27 points at week 5. Points increase at a constant rate. Find the slope and y-intercept.

1. Change in points: 27 - 12 = 15.
2. Change in weeks: 5 - 0 = 5, so the slope is 15/5 = 3 points per week.
3. At week 0, the account has 12 points, so the y-intercept is (0, 12).

Answer: Slope: 3 points per week; y-intercept: (0, 12).

PRACTICE 6 problems

1 Find the slope and y-intercept of y = 2x + 6.

ANSWER _____

2 Find the slope and y-intercept of y = -4x + 10.

ANSWER _____

3 Use the table to find the slope and y-intercept.

LINEAR FUNCTION

x	y
0	1
2	9
4	17

ANSWER _____

_____

4 Use the table to find the slope and y-intercept.

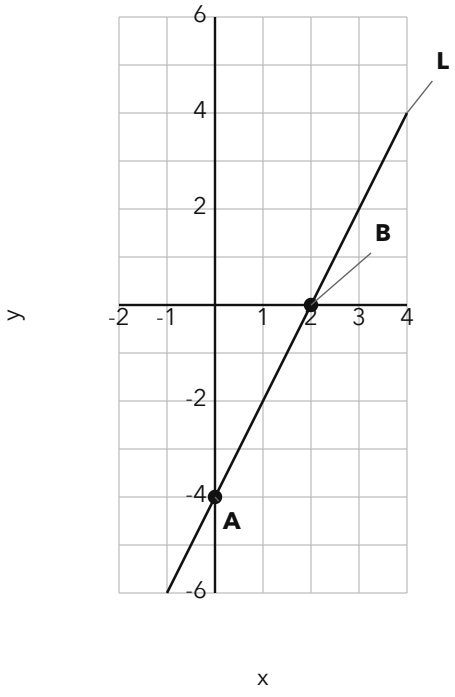
LINEAR FUNCTION

x	y
1	16
4	10
6	6

ANSWER _____

_____

5 Use the graph to find the slope and y-intercept of line L.



ANSWER _____

_____

6 A linear function passes through (2, 10) and (6, 18). Find its slope and y-intercept.

ANSWER _____

_____

APPLY IT Show your work

1 A music app uses 8 MB of data when opened and another 6 MB for each song played. Let x be the number of songs and y be the total data used. Find the slope and y-intercept, and tell what each means. How much data is used after 4 songs?

WORK SPACE

ANSWER _____

2 At a school game night, a player has 40 arcade credits. After 2 games, 32 credits remain; after 6 games, 16 credits remain. Let x be games played and y be credits remaining. Find the slope and y-intercept, and tell what each means.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A skate park charges a one-time entry fee plus a fixed amount per hour. A 2-hour visit costs $18, and a 6-hour visit costs $34. Find the slope and y-intercept of cost versus hours. Explain why the y-intercept is not $0.

WORK SPACE AND ANSWER

ANSWER KEY # Start and Change

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the slope and y-intercept of y = 2x + 6.	**Slope: 2; y-intercept: (0, 6).**
2	Find the slope and y-intercept of y = -4x + 10.	**Slope: -4; y-intercept: (0, 10).**
3	Use the table to find the slope and y-intercept.	**Slope: 4; y-intercept: (0, 1).**
4	Use the table to find the slope and y-intercept.	**Slope: -2; y-intercept: (0, 18).**
5	Use the graph to find the slope and y-intercept of line L.	**Slope: 2; y-intercept: (0, -4).**
6	A linear function passes through (2, 10) and (6, 18). Find its slope and y-intercept.	**Slope: 2; y-intercept: (0, 6).**

PART 2 · APPLY IT

1. **The slope is 6 MB per song, and the y-intercept is (0, 8), meaning the app uses 8 MB before any songs play. After 4 songs, it uses 32 MB.** The app starts at 8 MB and adds 6 MB per song. After 4 songs, the total is 8 + 6(4) = 32 MB.
2. **The slope is -4 credits per game, meaning 4 credits are used each game. The y-intercept is (0, 40), meaning the player starts with 40 credits.** The slope is (16 - 32)/(6 - 2) = -4 credits per game. At 0 games, the player has the starting balance of 40 credits.

CHALLENGE

The slope is (34 - 18)/(6 - 2) = $4 per hour. The y-intercept is (0, 10), since 18 - 4(2) = 10. The cost at 0 hours is $10 because the park still charges the entry fee.

Accept the y-intercept as either (0, b) or the starting value b when the meaning is clear. For context problems, slope units and the meaning of the starting value should be correct.