

Linear Model Lab

Find the rate and starting value to write each rule.

GRADE 8 • TEKS 8.5.I

8.5.I "write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations."

NAME _____

DATE _____

BUILD THE EQUATION

In $y = mx + b$, m tells how y changes for each additional unit of x . The value b is the starting value, when x is zero. Find the rate of change and starting value, then place them in the equation.

WORKED EXAMPLE

Use the table to write an equation in the form $y = mx + b$.

INPUT AND OUTPUT

x	y
0	8
1	14
5	38

1. When $x = 0$, $y = 8$, so $b = 8$.
2. From $x = 0$ to $x = 1$, y increases by 6, so $m = 6$.
3. Substitute m and b into $y = mx + b$.

Answer: $y = 6x + 8$

PRACTICE 5 problems

- 1** A value starts at 9 and increases by 7 for each additional x . Write an equation.

ANSWER _____

- 2** A line passes through (3, 24) and (7, 40). Write an equation in the form $y = mx + b$.

ANSWER _____

- 3** A value starts at 25 and decreases by 3 for each additional x . Write an equation.

ANSWER _____

- 4** When x is 2, y is 17. When x is 4, y is 23. Write an equation in the form $y = mx + b$.

ANSWER _____

- 5** A line passes through (7, 37) and (9, 45). Write an equation in the form $y = mx + b$.

ANSWER _____

APPLY IT Show your work

- 1** A video creator has 16 followers at the start of a challenge and gains 9 followers each day. Let x be days and y be followers. Write an equation.

WORK SPACE

ANSWER _____

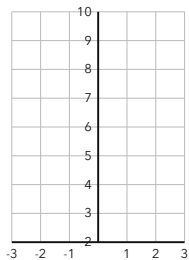
- 2** A phone battery is at 52% and loses 4 percentage points each hour during a game. Let x be hours and y be battery percentage. Write an equation.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Plot $(-3, 4)$ and $(3, 10)$ on the grid. A student says the equation is $y = x + 9$. Is the student correct? Write the correct equation and explain.



WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A value starts at 9 and increases by 7 for each additional x. Write an equation.	$y = 7x + 9$
2	A line passes through (3, 24) and (7, 40). Write an equation in the form $y = mx + b$.	$y = 4x + 12$
3	A value starts at 25 and decreases by 3 for each additional x. Write an equation.	$y = -3x + 25$
4	When x is 2, y is 17. When x is 4, y is 23. Write an equation in the form $y = mx + b$.	$y = 3x + 11$
5	A line passes through (7, 37) and (9, 45). Write an equation in the form $y = mx + b$.	$y = 4x + 9$

PART 2 • APPLY IT

1. $y = 9x + 16$ The creator starts with 16 followers, so $b = 16$. The number of followers rises by 9 each day, so $m = 9$.
2. $y = -4x + 52$ The starting battery percentage is 52, so $b = 52$. The battery decreases by 4 percentage points per hour, so $m = -4$.

CHALLENGE

No. The slope is 1 because y rises 6 while x rises 6. Using (3, 10), $10 = 3 + b$, so $b = 7$. The correct equation is $y = x + 7$.

Accept algebraically equivalent equations. For the challenge, accept any correct explanation that identifies slope 1 and starting value 7.