

Model Moves

Use linear equations to make sense of real data.

GRADE 8 • 8.FGR.6.2

8.FGR.6.2 "Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts."

NAME _____

DATE _____

READ THE MODEL

In $y = mx + b$, the slope m tells how much y changes when x increases by 1. The y -intercept b is the value of y when $x = 0$. To solve for a missing value, substitute a known value or use inverse operations, then check that your answer fits the context.

WORKED EXAMPLE

An account balance y , in dollars, follows $y = 7x - 9$, where x is hours worked. Find y when $x = 5$. Interpret the slope and y -intercept.

1. Substitute 5 for x : $y = 7(5) - 9$.
2. Multiply: $y = 35 - 9$.
3. Subtract: $y = 26$.
4. The slope is 7, and the y -intercept is -9.

Answer: After 5 hours, the balance is \$26. The balance rises \$7 per hour and starts at -\$9.

PRACTICE 6 problems

- 1** The equation $y = 4x + 12$ models the total cost y , in dollars, for x patches. State the slope and y -intercept. Interpret each value.

ANSWER _____

- 2** A battery model is $y = -2x + 18$, where y is battery percentage and x is hours. Find y when $x = 8$. What does the slope mean?

ANSWER _____

- 3** A points model is $y = 3x + 15$, where x is the number of tasks completed. How many tasks are completed when $y = 33$?

ANSWER _____

- 4** Find both intercepts of $y = -4x + 40$.

ANSWER _____

- 5** Find the x -intercept of $y = 6x - 24$. What is the value of y at an x -intercept?

ANSWER _____

- 6** For $y = \frac{1}{2}x + 8$, what value of x gives $y = 20$?

ANSWER _____

APPLY IT Show your work

- 1** A game design club sells custom controller skins. The total cost y , in dollars, is modeled by $y = 3x + 14$, where x is the number of skins. Find the cost of 8 skins. Interpret the slope and y-intercept.

WORK SPACE

ANSWER _____

- 2** A handheld game console begins a gaming session with 84% battery. Its battery level y , in percent, is modeled by $y = -6x + 84$, where x is hours of gaming. When will the battery level be 24%? Interpret the slope and y-intercept.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A model for a device battery is $y = -4x + 32$, where y is battery percentage and x is hours of use. The model only makes sense when the battery percentage is not negative. Find both intercepts. Then give the reasonable values of x and explain why.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	The equation $y = 4x + 12$ models the total cost y , in dollars, for x patches. State the slope and y -intercept. Interpret each value.	Slope: 4, so the cost increases by \$4 per patch. Y-intercept: (0, 12), so the starting cost is \$12.
2	A battery model is $y = -2x + 18$, where y is battery percentage and x is hours. Find y when $x = 8$. What does the slope mean?	$y = 2$. The battery percentage decreases by 2 percentage points per hour.
3	A points model is $y = 3x + 15$, where x is the number of tasks completed. How many tasks are completed when $y = 33$?	$x = 6$ tasks
4	Find both intercepts of $y = -4x + 40$.	Y-intercept: (0, 40). X-intercept: (10, 0).
5	Find the x -intercept of $y = 6x - 24$. What is the value of y at an x -intercept?	The x-intercept is (4, 0). At an x-intercept, $y = 0$.
6	For $y = 1/2x + 8$, what value of x gives $y = 20$?	$x = 24$

PART 2 • APPLY IT

- The cost is \$38. The slope means each skin costs \$3, and the y -intercept means there is a \$14 starting cost.** Substitute $x = 8$: $y = 3(8) + 14 = 38$. The coefficient of x is the cost per skin, and 14 is the cost when no skins are purchased.
- The battery level will be 24% after 10 hours. The slope means the battery loses 6 percentage points per hour, and the y -intercept means it starts at 84%.** Set $24 = -6x + 84$, then subtract 84 and divide by -6 to get $x = 10$. The negative slope shows a decrease, while 84 is the battery level at $x = 0$.

CHALLENGE

The y -intercept is (0, 32), and the x -intercept is (8, 0). The reasonable values are $0 \leq x \leq 8$ because time cannot be negative and the battery percentage cannot be negative.

Accept equivalent equation work and intercepts written as coordinate pairs or described in words. For interpretations, accept clear statements that connect slope to the rate of change and the y -intercept to the starting value.