

Model Meaning Mission

Use linear equations to make predictions that fit real situations.

GRADE 8 • 8.SP.A.3

CCSS.Math.Content.8.SP.A.3 "Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment..."

NAME _____

DATE _____

READ THE MODEL

A linear model has the form $y=mx+b$. The slope, m , tells how y changes for every 1-unit increase in x , and the intercept, b , is the model's predicted y -value when $x=0$. Substitute a known x -value to predict y , or set the equation equal to a known y -value and solve for x .

WORKED EXAMPLE

A model for total points y after x rounds is $y=13x+17$. Predict y when $x=6$.

1. Substitute $x=6$: $y=13(6)+17$.
2. Multiply: $y=78+17$.
3. Add: $y=95$.

Answer: 95 points. The model adds 13 points for each round and predicts 17 points at 0 rounds.

PRACTICE 6 problems

- 1** The model $y=3x+11$ relates x practice sessions to y points. What does the slope mean?

ANSWER _____

- 2** A phone battery model is $y=-4x+20$, where x is hours and y is battery percent. What does the intercept mean?

ANSWER _____

- 3** For the model $y=5x+7$, find y when $x=4$.

ANSWER _____

- 4** For the model $y=8x+1$, find x when $y=41$.

ANSWER _____

- 5** For the model $y=-3x+24$, find y when $x=4$.

ANSWER _____

- 6** The model $y=1/2x+10$ relates x minutes of reading to y pages read. Interpret the slope and intercept.

ANSWER _____

APPLY IT Show your work

- 1** A video creator models the number of subscribers, y , after x weeks with $y=12x+85$. Interpret the slope and intercept, then predict the number of subscribers after 5 weeks.

WORK SPACE

ANSWER _____

- 2** A gamer models a device's battery percent, y , after x hours of play with $y=-7x+92$. Predict the battery percent after 8 hours, and interpret the slope and intercept.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A fitness tracker uses $y=3x+64$ to model heart rate y , in beats per minute, x minutes into a workout. The data used for the model were collected only from minute 8 through minute 24. A student says the intercept proves the person's heart rate was exactly 64 beats per minute at the start. Is the claim supported? Explain the slope and whether the intercept should be treated as exact.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	The model $y=3x+11$ relates x practice sessions to y points. What does the slope mean?	Each additional practice session is associated with 3 more points.
2	A phone battery model is $y=-4x+20$, where x is hours and y is battery percent. What does the intercept mean?	The model predicts a battery level of 20% at 0 hours.
3	For the model $y=5x+7$, find y when $x=4$.	27
4	For the model $y=8x+1$, find x when $y=41$.	$x=5$
5	For the model $y=-3x+24$, find y when $x=4$.	12
6	The model $y=1/2x+10$ relates x minutes of reading to y pages read. Interpret the slope and intercept.	The slope means 1/2 page per minute. The intercept means the model predicts 10 pages read at 0 minutes.

PART 2 • APPLY IT

- The slope means 12 subscribers are added each week. The intercept means the model predicts 85 subscribers at 0 weeks. After 5 weeks, the model predicts 145 subscribers.** Substitute $x=5$: $y=12(5)+85=145$. Use the units to interpret 12 as subscribers per week and 85 as the starting prediction.
- The model predicts 36% battery after 8 hours. The slope means the battery decreases by 7 percentage points per hour, and the intercept means the model predicts 92% battery at 0 hours.** Substitute $x=8$: $y=-7(8)+92=36$. The negative slope shows a decrease, while 92 is the predicted starting battery percent.

CHALLENGE

The slope means the model predicts heart rate increases by 3 beats per minute for each additional minute. The claim is not supported because 0 minutes is outside the data range, so 64 is an extrapolated prediction, not proof of the exact starting heart rate.

Accept equivalent wording for slope and intercept interpretations when the units and direction of change are correct. Accept $x=5$ or 5 for the equation-solving item.