LESSON MAKER PRO

Model It Forward

Use slope and intercept to make sense of data.

GRADE 8 · NY-8.SP.3

NY-8.SP.3 "Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept."

NAME _____ DATE _____

THE BIG IDEA

A linear model often has the form y = mx + b. The slope m tells how much y changes when x increases by 1, and the intercept b tells the value of y when x = 0. Substitute a known x-value to predict y, or set y to a known value and solve for x.

WORKED EXAMPLE

A model is y = 5x + 11. Find y when x = 2.

1. Substitute 2 for x: y = 5(2) + 11.
2. Multiply: y = 10 + 11.
3. Add: y = 21.

Answer: 21

PRACTICE 6 problems

1 A model is y = 4x + 6. Find y when x = 3.

ANSWER _____

2 A model y = -3x + 80 gives a phone's battery percentage y after x hours. What does the slope -3 mean?

ANSWER _____

3 A model y = 7x + 9 gives a plant's height y in centimeters after x weeks. What does the intercept 9 mean?

ANSWER _____

4 For the model y = 6x + 1, find x when y = 25.

ANSWER _____

5 A temperature model is y = -4x + 30, where y is temperature in degrees Celsius and x is hours. Find y when x = 6.

ANSWER _____

6 A plant's height is modeled by y = 8x + 12, where y is height in centimeters and x is weeks. State the slope and the y-intercept.

ANSWER _____

APPLY IT Show your work

1 A music app records y megabytes of storage used after x songs are downloaded. The table shows the data, and the model is y = 4x + 14. How much storage is used after 7 songs? Interpret the slope and intercept.

MUSIC APP STORAGE

Songs downloaded, x	Storage used, y (MB)
0	14
1	18
3	26
4	30

ANSWER _____

2 A game download meter shows y megabytes downloaded after x minutes, modeled by y = 7x + 15. How many minutes have passed when y = 43? What does 15 mean in this context?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two fitness apps estimate calories y burned after x minutes in the same workout. App A uses y = 6x + 18. App B uses y = 9x + 6. At what number of minutes do the apps give the same estimate, and what is that estimate? Explain which app begins higher and which app increases faster.

WORK SPACE AND ANSWER

ANSWER KEY

Model It Forward

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A model is y = 4x + 6. Find y when x = 3.	**18**
2	A model y = -3x + 80 gives a phone's battery percentage y after x hours. What does the slope -3 mean?	**The battery percentage decreases by 3 percentage points each hour.**
3	A model y = 7x + 9 gives a plant's height y in centimeters after x weeks. What does the intercept 9 mean?	**The plant was 9 centimeters tall when x = 0 weeks.**
4	For the model y = 6x + 1, find x when y = 25.	**x = 4**
5	A temperature model is y = -4x + 30, where y is temperature in degrees Celsius and x is hours. Find y when x = 6.	**6 degrees Celsius**
6	A plant's height is modeled by y = 8x + 12, where y is height in centimeters and x is weeks. State the slope and the y-intercept.	**Slope: 8 centimeters per week. y-intercept: 12 centimeters.**

PART 2 · APPLY IT

1. **42 MB. Storage use increases by 4 MB per song, and 14 MB is used when no songs are downloaded.** Substitute x = 7 into y = 4x + 14 to get y = 42. The coefficient of x is the storage increase per song, and 14 is the starting storage use.
2. **4 minutes. At the time tracking began, 15 MB had already been downloaded.** Set 43 = 7x + 15, then subtract 15 and divide by 7 to get x = 4. The intercept is the amount downloaded at 0 minutes of tracking.

CHALLENGE

At x = 4 minutes, both apps estimate 42 calories. App A begins higher because its intercept is 18, and App B increases faster because its slope is 9 calories per minute.

Accept equivalent wording for slope and intercept interpretations when the units and direction are correct. For the challenge, accept an equation-based explanation that identifies App A as having the higher starting value and App B as having the greater rate of change.