LESSON MAKER PRO

Model Meaning Mission

Use linear equations to predict and explain data.

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

In y=mx+b, the slope m tells how much y changes for each increase of 1 in x. The intercept b is the predicted value of y when x is 0. Substitute a given x-value into the equation to make a prediction.

WORKED EXAMPLE

A model for a skateboarder's travel distance y, in meters, after x minutes is y=6x+5. Find y when x=4.

1. Substitute 4 for x: y=6(4)+5.
2. Multiply: y=24+5.
3. Add: y=29.

Answer: 29 meters

PRACTICE 6 problems

1 A model for points scored y in a video game after x rounds is y=3x+12. Interpret the slope and the intercept.

ANSWER _____

2 A model for the temperature y, in degrees Celsius, of a science lab sample after x minutes is y=2x+15. Find y when x=9.

ANSWER _____

3 A model for a device's battery level y, as a percent, after x hours of use is y=-7x+40. Find y when x=2.

ANSWER _____

4 A model for a player's jump height y, in centimeters, after x practice sessions is y=8x+14. For what value of x does the model predict y=38?

ANSWER _____

5 A model for the storage used y, in megabytes, after x music downloads is y=1/2x+20. Find y when x=16.

ANSWER _____

6 A model for the height y, in centimeters, of a bean sprout after x days is y=9x+11. Interpret the slope and the intercept.

ANSWER _____

APPLY IT Show your work

1 A reading app models the number of pages y that Jordan reads after x reading sessions with y=18x+42. How many pages does the model predict after 7 sessions? Interpret both the slope and the intercept in this context.

WORK SPACE

ANSWER _____

2 The table shows battery observations for a phone while streaming. A linear model for battery level y, as a percent, after x hours is y=-12x+96. What battery level does the model predict after 7 hours? Interpret both the slope and the intercept.

BATTERY OBSERVATIONS

Hours streaming, x	Battery level (%), y
1	84
2	72
3	60

ANSWER _____

CHALLENGE One step up

Two student artists model their total sticker sales y after x days. Artist A uses y=3x+30, and Artist B uses y=8x+15. At what x-value do the models predict the same total sales? What total does each model predict? Explain how you know.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A model for points scored y in a video game after x rounds is y=3x+12. Interpret the slope and the intercept.	**Slope: Each additional round is associated with 3 more points. Intercept: The model predicts 12 points at 0 rounds.**
2	A model for the temperature y, in degrees Celsius, of a science lab sample after x minutes is y=2x+15. Find y when x=9.	**33 degrees Celsius**
3	A model for a device's battery level y, as a percent, after x hours of use is y=-7x+40. Find y when x=2.	**26%**
4	A model for a player's jump height y, in centimeters, after x practice sessions is y=8x+14. For what value of x does the model predict y=38?	**x=3 practice sessions**
5	A model for the storage used y, in megabytes, after x music downloads is y=1/2x+20. Find y when x=16.	**28 megabytes**
6	A model for the height y, in centimeters, of a bean sprout after x days is y=9x+11. Interpret the slope and the intercept.	**Slope: Each additional day is associated with 9 more centimeters of height. Intercept: The model predicts a height of 11 centimeters at 0 days.**

PART 2 · APPLY IT

1. **The model predicts 168 pages. The slope means each additional reading session is associated with 18 more pages. The intercept means the model predicts 42 pages at 0 sessions.** Substitute x=7: y=18(7)+42=168. Then state the meanings of 18 pages per session and 42 pages at zero sessions.
2. **The model predicts a battery level of 12%. The slope means each additional hour of streaming is associated with a decrease of 12 percentage points. The intercept means the model predicts a battery level of 96% at 0 hours.** Substitute x=7: y=-12(7)+96=12. Interpret the negative slope as a decrease and the intercept as the predicted starting battery level.

CHALLENGE

At x=3 days, both models predict y=39 sticker sales. Substituting 3 into each equation gives the same value, 39.

Accept equivalent wording for slope as a rate of change and intercept as the predicted value when x=0. Accept correct units when students include them.