LESSON MAKER PRO

Models That Matter

Use slope and intercepts to read real-world linear models.

HIGH SCHOOL · HSS-ID.C

CCSS.Math.Content.HSS-ID.C "Interpret linear models"

NAME _____ DATE _____

READ THE MODEL

In a linear model y = mx + b, m is the rate of change and b is the starting value when x = 0. Use the context to name what y, x, the rate, and the starting value represent.

WORKED EXAMPLE

A club starts with $9 and adds $4 each week. Write a linear model for total dollars y after x weeks.

1. The starting amount is 9, so b = 9.
2. The amount added each week is 4, so m = 4.
3. Substitute into y = mx + b: y = 4x + 9.

Answer: y = 4x + 9

PRACTICE 6 problems

1 For the model y = 7x + 5, state the slope and explain what it means.

ANSWER _____

2 For the model y = -2x + 18, state the y-intercept and explain what it means.

ANSWER _____

3 A table shows x = 0, y = 11 and x = 3, y = 20. Write the linear model.

ANSWER _____

4 Use y = 6x - 1 to find y when x = 5.

ANSWER _____

5 The model h = 15 - 3t gives the height h of a candle, in centimeters, after t hours. When will the candle height be 0?

ANSWER _____

6 Model A is y = 7x + 1. Model B is y = 5x + 13. Which model has the greater rate of change, and at what x-value do the models have the same y-value?

ANSWER _____

APPLY IT Show your work

1 A school dance photo booth charges an $11 booking fee plus $2 for each printed photo. Let x be the number of photos and y be the total cost. Write a linear model, then find the cost of 13 photos.

WORK SPACE

ANSWER _____

2 Your phone battery is at 86% at noon and drops 7 percentage points each hour. Let h be the number of hours after noon and let b be the battery percentage. Write a linear model, find the battery percentage after 6 hours, and find when the battery reaches 30%.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two membership plans have total costs modeled by A = 18 + 5x and B = 42 + 3x, where x is the number of months. Explain when the plans cost the same and which plan costs less before and after that time.

_____

_____

ANSWER KEY

Models That Matter

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For the model y = 7x + 5, state the slope and explain what it means.	**Slope: 7. For each increase of 1 in x, y increases by 7.**
2	For the model y = -2x + 18, state the y-intercept and explain what it means.	**y-intercept: 18. When x = 0, y is 18.**
3	A table shows x = 0, y = 11 and x = 3, y = 20. Write the linear model.	**y = 3x + 11**
4	Use y = 6x - 1 to find y when x = 5.	**29**
5	The model h = 15 - 3t gives the height h of a candle, in centimeters, after t hours. When will the candle height be 0?	**5 hours**
6	Model A is y = 7x + 1. Model B is y = 5x + 13. Which model has the greater rate of change, and at what x-value do the models have the same y-value?	**Model A has the greater rate of change. The models have the same y-value when x = 6.**

PART 2 · APPLY IT

1. **y = 2x + 11; the cost of 13 photos is $37.** The booking fee is the starting value, and the price per photo is the rate of change. Substitute x = 13 into y = 2x + 11.
2. **b = 86 - 7h; after 6 hours, b = 44%; the battery reaches 30% after 8 hours.** The battery begins at 86, and the negative slope shows a drop of 7 percentage points per hour. Solve 86 - 7h = 30 to find the time when it reaches 30%.

CHALLENGE

The plans cost the same at 12 months, when each costs $78. Plan A costs less before 12 months because it starts lower. Plan B costs less after 12 months because it increases by less each month.

Accept equivalent algebraic forms, such as 3x + 11 for y = 3x + 11. For contextual interpretations, accept clear statements that correctly identify the rate of change and starting value with appropriate units.