LESSON MAKER PRO

Data Line Detectives

Use bivariate data to model real situations.

GRADE 8 · 8.FGR.6

8.FGR.6 "Solve practical, linear problems involving situations using bivariate quantitative data."

NAME _____ DATE _____

BUILD A LINEAR MODEL

When two quantities change at a constant rate, you can model them with y=mx+b. Find the rate of change, m, from two data pairs, then use one pair to find the starting value, b. Use the equation to predict a new value or solve for an unknown.

WORKED EXAMPLE

A print shop records that 2 posters cost $17 and 5 posters cost $29. Write an equation for the cost y of x posters. Then find the cost of 7 posters. Assume a fixed setup fee plus a constant price per poster.

1. Find the rate: (29-17)/(5-2)=12/3=4.
2. Use a data pair: 17=4(2)+b, so b=9.
3. Write the model: y=4x+9.
4. Substitute x=7: y=4(7)+9=37.

Answer: y=4x+9, and 7 posters cost $37.

PRACTICE 6 problems

1 A table includes the pairs x=1, y=14 and x=3, y=20. Write the linear equation that models the data.

ANSWER _____

2 Assume a linear relationship. A table includes the pairs x=3, y=19 and x=6, y=28. What is y when x=8?

ANSWER _____

3 The relationship y=6x+1 models the number of points y earned after x tasks. How many points are earned after 8 tasks?

ANSWER _____

4 A plant grows from 16 centimeters at day 3 to 31 centimeters at day 8. What is the average rate of growth over this interval in centimeters per day?

ANSWER _____

5 A linear data set includes x=3, y=22 and x=6, y=31. What is the y-intercept?

ANSWER _____

6 For the equation y=6x+1, find x when y=49.

ANSWER _____

APPLY IT Show your work

1 A school photo booth charges a $6 entry fee plus $3 for each print. Let x be the number of prints and y be the total cost in dollars. Write an equation for the cost. Then find the cost of 8 prints.

WORK SPACE

ANSWER

2 The esports club compares jersey orders. An order of 3 jerseys costs $48, and an order of 6 jerseys costs $72. Let x be the number of jerseys and y be the total cost in dollars. Write the linear equation, then find the cost of 8 jerseys.

WORK SPACE

ANSWER

CHALLENGE One step up

At a skate park, Plan A costs y=3x+18 dollars for x visits. Plan B costs y=6x dollars. At how many visits do the plans cost the same, and what is that cost? Which plan costs less for more than 6 visits? Explain using the equations.

WORK SPACE AND ANSWER

ANSWER KEY

Data Line Detectives

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A table includes the pairs x=1, y=14 and x=3, y=20. Write the linear equation that models the data.	**y=3x+11**
2	Assume a linear relationship. A table includes the pairs x=3, y=19 and x=6, y=28. What is y when x=8?	**34**
3	The relationship y=6x+1 models the number of points y earned after x tasks. How many points are earned after 8 tasks?	**49**
4	A plant grows from 16 centimeters at day 3 to 31 centimeters at day 8. What is the average rate of growth over this interval in centimeters per day?	**3 centimeters per day**
5	A linear data set includes x=3, y=22 and x=6, y=31. What is the y-intercept?	**13**
6	For the equation y=6x+1, find x when y=49.	**8**

PART 2 · APPLY IT

1. **y=3x+6; $30** The cost rises by $3 per print, and the starting fee is $6, so y=3x+6. Substitute x=8 to get y=30.
2. **y=8x+24; $88** The rate is (72-48)/(6-3)=8 dollars per jersey. Using 48=8(3)+b gives b=24, and y=8(8)+24=88.

CHALLENGE

The plans match at 6 visits, and each costs $36. For more than 6 visits, Plan A costs less because its cost increases by $3 per visit while Plan B increases by $6 per visit.

Accept equivalent equation forms, such as y=11+3x. For word problems, accept correct dollar notation and require both the equation and the requested predicted cost.