LESSON MAKER PRO

Costs on the Line

Turn costs into equations, graphs, and predictions

HIGH SCHOOL · A1P.AF.D.12

A1P.AF.D.12 "Create equations in two or more variables to represent relationships between quantities in context; graph equations on coordinate axes with labels and scales and use them to make predictions. Limit to contexts arising from linear..."

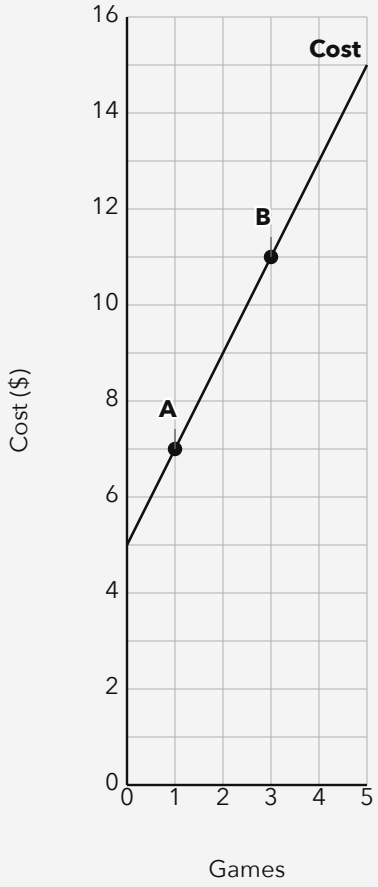
NAME _____ DATE _____

FROM GRAPH TO RULE

For a steady rate, write y = mx + b. The rate m is the change in y divided by the change in x, and b is the value of y when x is 0. Label both axes and choose a scale that fits your points.

WORKED EXAMPLE

The graph shows the total cost y of renting x games. Write an equation and predict the cost of 5 games.



1. Read A = (1, 7) and B = (3, 11).
2. Find the rate: m = (11 - 7)/(3 - 1) = 2.
3. Use A: 7 = 2(1) + b, so b = 5. The rule is y = 2x + 5.

4. For 5 games, y = 2(5) + 5 = 15.

Answer: y = 2x + 5; 5 games cost $15.

PRACTICE 4 problems

1 A club charges $12 to join and $4 per event. Let x be events and y be total cost. Write an equation and find the cost of 6 events.

ANSWER _____

2 A phone has 80% battery and loses 10 percentage points each hour. Let x be hours and y be battery percent. Write an equation and predict y after 6 hours.

ANSWER _____

3 A video has 30 views and gains 20 views each hour. Let x be hours from now and y be views. Write an equation and predict the views after 4 hours.

ANSWER _____

4 A merch booth charges $9 per patch plus $6 shipping. Let x be patches and y be total cost. Write an equation and give two points on its graph.

ANSWER _____

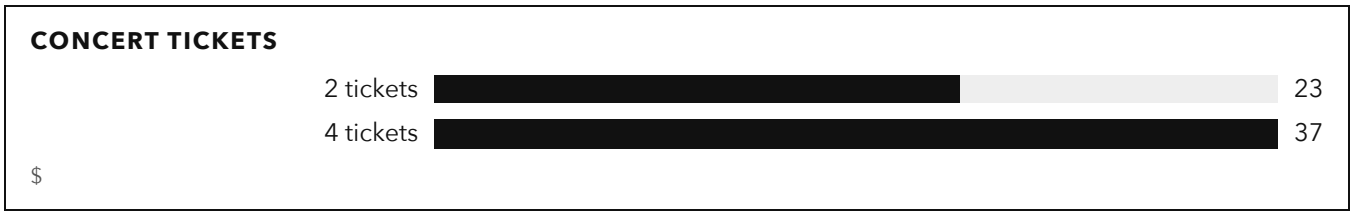
APPLY IT Show your work

1 The chart shows the cost of a mobile data plan. Let x be gigabytes and y be cost in dollars. Write an equation. On axes you label and scale, sketch its graph using the chart's points. Predict the cost of 6 GB.



ANSWER _____

2 The chart shows concert ticket costs, including one order fee. Let x be tickets and y be total cost in dollars. Write an equation. On axes you label and scale, sketch its graph using the chart's points. Predict the cost of 6 tickets.



ANSWER _____

CHALLENGE One step up

Two movie plans charge different monthly costs. Plan A costs $8 plus $4 per movie. Plan B costs $14 plus $2 per movie. Let x be movies and y be total cost. Write both equations and find when the plans cost the same.

WORK SPACE AND ANSWER

ANSWER KEY

Costs on the Line

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A club charges $12 to join and $4 per event. Let x be events and y be total cost. Write an equation and find the cost of 6 events.	**y = 4x + 12; $36.**
2	A phone has 80% battery and loses 10 percentage points each hour. Let x be hours and y be battery percent. Write an equation and predict y after 6 hours.	**y = 80 - 10x; 20%.**
3	A video has 30 views and gains 20 views each hour. Let x be hours from now and y be views. Write an equation and predict the views after 4 hours.	**y = 20x + 30; 110 views.**
4	A merch booth charges $9 per patch plus $6 shipping. Let x be patches and y be total cost. Write an equation and give two points on its graph.	**y = 9x + 6; for example, (0, 6) and (2, 24).**

PART 2 · APPLY IT

1. **y = 4x + 10; 6 GB costs $34. Graph the line through (2, 18) and (4, 26), with gigabytes on the x-axis and cost ($) on the y-axis.** The cost rises $8 over 2 GB, so the rate is $4 per GB. Substituting (2, 18) gives a $10 starting cost.
2. **y = 7x + 9; 6 tickets cost $51. Graph the line through (2, 23) and (4, 37), with tickets on the x-axis and cost ($) on the y-axis.** The cost rises $14 for 2 more tickets, so each ticket costs $7. Substituting (2, 23) gives a $9 order fee.

CHALLENGE

Plan A: y = 4x + 8. Plan B: y = 2x + 14. They both cost $20 for 3 movies.

Accept equivalent equations. For each word-problem graph, accept any clear, consistent axis scales that show both chart points and the predicted point.