LESSON MAKER PRO

Rates in Context

Read what a linear model tells you.

HIGH SCHOOL · FA.F.16

FA.F.16 "Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (8.F.4)"

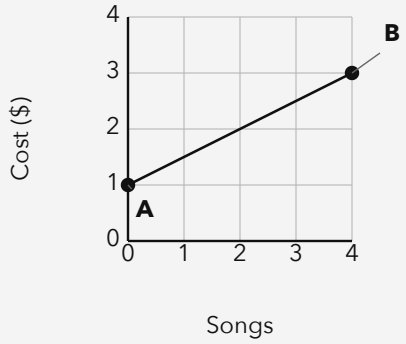
NAME _____ **DATE** _____

THE BIG IDEA

Find the rate of change by dividing the change in output by the change in input. The initial value is the output when the input is 0. Describe each value with units that fit the situation.

WORKED EXAMPLE

The graph shows the total cost of downloading x songs. Find the cost per song and the starting fee.



1. Cost changes by 3 - 1 = 2 dollars.
2. Songs change by 4 - 0 = 4, so the rate is 2/4 = 1/2 dollar per song.
3. At 0 songs, the cost is $1.

Answer: $0.50 per song; $1 starting fee

PRACTICE 4 problems

1 A streaming plan costs y = 3x + 5 dollars for x months. What are the monthly rate and initial charge?

ANSWER _____

2 A phone's battery percentage after x hours is y = -8x + 96. Interpret the rate of change.

ANSWER _____

3 A plant's height after x weeks is y = 2x + 9 centimeters. What does the initial value mean?

ANSWER _____

4 A tank holds y = -3x + 18 gallons after x minutes of draining. Interpret the rate and initial value.

ANSWER _____

_____

APPLY IT Show your work

1 A photo-print order has a shipping fee. Use the table to find the price per print and the shipping fee.

PHOTO-PRINT ORDER

Prints	Total cost ($)
0	7
2	15
4	23

ANSWER _____

2 A phone plan has data left as the month passes. Use the table to interpret the rate of change and initial value.

DATA REMAINING

Days	Data left (GB)
0	20
2	16
4	12

ANSWER _____

CHALLENGE One step up

A ride-share fare is $14 for 2 miles and $26 for 5 miles. Assume the fare is linear. Find the cost per mile and the starting fee. Explain how you found the fee.

WORK SPACE AND ANSWER

ANSWER KEY

Rates in Context

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A streaming plan costs y = 3x + 5 dollars for x months. What are the monthly rate and initial charge?	**$3 per month; $5 initial charge**
2	A phone's battery percentage after x hours is y = -8x + 96. Interpret the rate of change.	**The battery loses 8 percentage points per hour.**
3	A plant's height after x weeks is y = 2x + 9 centimeters. What does the initial value mean?	**The plant was 9 centimeters tall at week 0.**
4	A tank holds y = -3x + 18 gallons after x minutes of draining. Interpret the rate and initial value.	**The tank loses 3 gallons per minute; it held 18 gallons when draining began.**

PART 2 · APPLY IT

1. **$4 per print; $7 shipping fee** The cost rises $8 for 2 prints, so each print costs $4. The cost at 0 prints is $7.
2. **The data left decreases by 2 GB per day; the plan started with 20 GB.** Data left changes by -4 GB over 2 days, giving -2 GB per day. At day 0, 20 GB remains.

CHALLENGE

$4 per mile; $6 starting fee. The fare rises $12 over 3 miles, so the rate is $4 per mile. Subtracting $8 for the first 2 miles from $14 leaves a $6 starting fee.

Accept equivalent wording with correct units. For a decreasing quantity, accept either a negative rate or a statement that it decreases by the stated amount.