LESSON MAKER PRO

Function Story Lab

Connect each function to what its numbers mean.

HIGH SCHOOL · HSF-IF.B

CCSS.Math.Content.HSF-IF.B "Interpret functions that arise in applications in terms of the context"

NAME _____ DATE _____

READ THE MODEL

In a function model, the input represents one quantity and the output represents another quantity. Use the context to name the units, decide which inputs make sense, and explain what a rate of change tells you.

WORKED EXAMPLE

A bike shop models a repair cost with C(h) = 17h + 29, where h is the number of labor hours. Find C(6) and interpret the result.

1. Substitute h = 6: C(6) = 17(6) + 29.
2. Multiply: C(6) = 102 + 29.
3. Add: C(6) = 131.

Answer: C(6) = 131. A 6-hour repair costs $131.

PRACTICE 6 problems

1 The function p(n) = 4n + 15 gives the cost, in dollars, of buying n game passes. Find p(8) and interpret the result.

ANSWER _____

2 The function g(x) = 84 - 5x gives the number of pages remaining in a book after x days. Find g(7) and interpret the result.

ANSWER _____

3 An equipment rental costs R(d) = 26d + 9 dollars, where d is the number of whole days the equipment is used. A rental must be used for at least 1 day and can last at most 8 days. State the domain of R.

ANSWER _____

4 The function $y = t^2 + 3$ gives the height of a model rocket, in inches, t seconds after launch. Find the average rate of change from t = 1 to t = 4.

ANSWER _____

5 The function L(m) = -3m + 78 gives a laptop battery level, in percent, after m minutes. Explain what L(0) = 78 and the slope -3 mean.

ANSWER _____

6 The table gives F(t), the dollars raised in a fundraiser after t hours. Find the average rate of change from t = 0 to t = 4. t: 0, 2, 4 F(t): 20, 28, 36

ANSWER _____

APPLY IT Show your work

1 A 14-day mobile data cycle begins with 28 GB. The function D(d) = 28 - 2d gives the number of GB remaining after d whole days. Find D(9), interpret it, and state an appropriate domain for d.

WORK SPACE

ANSWER _____

2 A student is saving for a concert ticket. The function S(w) = 7w + 24 gives the amount saved, in dollars, after w weeks. Find S(8) and the average rate of change from w = 2 to w = 8. Interpret both results.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A soccer ball's height is modeled by $h(t) = -3t^2 + 11t$, where h is in meters and t is in seconds. Find the average rate of change from t = 0 to t = 1 and from t = 1 to t = 2. Explain what the comparison tells you about the ball's motion.

WORK SPACE AND ANSWER

Function Story Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The function p(n) = 4n + 15 gives the cost, in dollars, of buying n game passes. Find p(8) and interpret the result.	**p(8) = 47. Eight game passes cost $47.**
2	The function g(x) = 84 - 5x gives the number of pages remaining in a book after x days. Find g(7) and interpret the result.	**g(7) = 49. After 7 days, 49 pages remain.**
3	An equipment rental costs R(d) = 26d + 9 dollars, where d is the number of whole days the equipment is used. A rental must be used for at least 1 day and can last at most 8 days. State the domain of R.	**d can be 1, 2, 3, 4, 5, 6, 7, or 8.**
4	The function $y = t^2 + 3$ gives the height of a model rocket, in inches, t seconds after launch. Find the average rate of change from t = 1 to t = 4.	**5 inches per second.**
5	The function L(m) = -3m + 78 gives a laptop battery level, in percent, after m minutes. Explain what L(0) = 78 and the slope -3 mean.	**The battery begins at 78%. Its battery level decreases by 3 percentage points each minute.**
6	The table gives F(t), the dollars raised in a fundraiser after t hours. Find the average rate of change from t = 0 to t = 4. t: 0, 2, 4 F(t): 20, 28, 36	**4 dollars per hour.**

PART 2 · APPLY IT

1. **D(9) = 10. After 9 whole days, 10 GB remain. An appropriate domain is d = 0, 1, 2, ..., 14.** Substitute 9 for d to get 28 - 18 = 10. Because the cycle lasts 14 days and d counts whole days, use the integers from 0 through 14.
2. **S(8) = 80, so the student has saved $80 after 8 weeks. The average rate of change is $7 per week, so the savings increase by $7 each week.** Evaluate 7(8) + 24 to find the amount after 8 weeks. Since the function is linear, its average rate of change over any interval is its slope, 7 dollars per week.

CHALLENGE

From 0 to 1 second, the average rate of change is 8 meters per second. From 1 to 2 seconds, it is 2 meters per second. The ball is still rising from 1 to 2 seconds, but it is rising more slowly.

Accept equivalent interval notation for the domain in problem 3 only if it clearly indicates whole-number inputs from 1 through 8. For average rate of change, accept equivalent unit forms such as dollars/hour or meters per second.