LESSON MAKER PRO

Rules for Real Life

Build and adjust functions for everyday costs and totals.

GRADE 8 · 8A.AF.K

8A.AF.K "Functions model a wide variety of real situations and can help students understand the processes of making and changing assumptions, assigning variables, and finding solutions to contextual problems."

NAME _____ DATE _____

MODEL THE CHANGE

Choose x for the input that changes, then write a function for the output. Combine a starting amount with a rate for each unit of x. If a starting amount or rate changes, update that part of the rule.

WORKED EXAMPLE

A bike rental costs $7 to start and $3 per hour. Let x be the number of hours. Write a cost function C(x), then find the cost for 4 hours.

1. The starting cost is $7, and each hour adds $3.
2. C(x) = 7 + 3x
3. C(4) = 7 + 3(4) = 19

Answer: C(x) = 7 + 3x; the cost for 4 hours is $19.

PRACTICE 6 problems

1 A sticker printer charges $5 to set up and $2 per sticker. Let x be the number of stickers. Write a function P(x) for the total cost.

ANSWER _____

2 A video has 80 views and gets 12 new views each day. Let x be the number of days. Write V(x) for the total views, then find V(5).

ANSWER _____

3 You start a game with 50 coins and spend 6 coins on each hint. Let x be the number of hints you buy. Write C(x) for your coins left, then find C(2).

ANSWER _____

4 A streaming plan costs M(x) = 9 + 2x dollars for x movies in one month. What does the 9 represent? What does the rule assume about that amount?

ANSWER _____

5 One snack stand charges S(x) = 6x + 10 dollars for x snack packs. Another charges $8 to start and $6 per pack. Write the second stand's cost function T(x), then name the cheaper stand for 5 packs.

ANSWER _____

6 A club's cost for x wristbands is W(x) = 15 + 2x dollars. If the club spends exactly $39, how many wristbands does it order?

ANSWER _____

APPLY IT Show your work

1 A school esports club pays $18 to rent a room and $5 for each player. Let x be the number of players. Assuming there are no other fees, write a function C(x) for the total cost and find the cost for 6 players.

WORK SPACE

ANSWER _____

2 You spend $30 on supplies to make keychains and earn $6 for each one you sell. Let x be the number sold. Assuming you sell every keychain you make and have no other costs, write a profit function P(x). How many must you sell to break even?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two arcade passes cost A(x) = 10 + 6x and B(x) = 45 + 2x dollars for x games. The arcade lowers Pass B's starting fee to $30 but keeps its per-game price. Write the new function for Pass B. For how many games will the passes cost the same? Explain what changed in Pass B's rule.

WORK SPACE AND ANSWER

ANSWER KEY # Rules for Real Life

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A sticker printer charges $5 to set up and $2 per sticker. Let x be the number of stickers. Write a function P(x) for the total cost.	**P(x) = 5 + 2x**
2	A video has 80 views and gets 12 new views each day. Let x be the number of days. Write V(x) for the total views, then find V(5).	**V(x) = 80 + 12x; V(5) = 140 views.**
3	You start a game with 50 coins and spend 6 coins on each hint. Let x be the number of hints you buy. Write C(x) for your coins left, then find C(2).	**C(x) = 50 - 6x; C(2) = 38 coins.**
4	A streaming plan costs M(x) = 9 + 2x dollars for x movies in one month. What does the 9 represent? What does the rule assume about that amount?	**The $9 is the monthly fee. It stays the same no matter how many movies you watch.**
5	One snack stand charges S(x) = 6x + 10 dollars for x snack packs. Another charges $8 to start and $6 per pack. Write the second stand's cost function T(x), then name the cheaper stand for 5 packs.	**T(x) = 8 + 6x; the second stand is cheaper for 5 packs ($38 instead of $40).**
6	A club's cost for x wristbands is W(x) = 15 + 2x dollars. If the club spends exactly $39, how many wristbands does it order?	**12 wristbands**

PART 2 · APPLY IT

1. **C(x) = 18 + 5x; the cost for 6 players is $48.** Add the $18 room fee to $5 per player. C(6) = 18 + 5(6) = 48.
2. **P(x) = 6x - 30; you must sell 5 keychains to break even.** Profit is earnings minus the supply cost, so P(x) = 6x - 30. Set the profit to zero: 6x - 30 = 0, so x = 5.

CHALLENGE

The new function is B(x) = 30 + 2x. The passes cost the same for 5 games: each costs $40. Pass B's starting fee fell by $15, while its $2 per-game price stayed the same.

Accept equivalent function rules with terms in a different order. In the challenge, accept an explanation that Pass B costs $15 less than before for any number of games.