Rate Pattern Sort

Decide whether equal steps add or multiply.

AI-F.LE.1.b "Recognize situations in which one quantity changes at a constant rate per unit interval relative to another, and therefore can be modeled linearly."

NAME _____ DATE _____

SAME AMOUNT ADDED

When the input increases by 1, the output adds or subtracts the same amount. This constant rate can be modeled with a linear function.

$p = 14 + 5d$, where d is the number of days.

SAME FACTOR MULTIPLIED

When the input increases by 1, the output is multiplied by the same factor. This pattern can be modeled with an exponential function.

$n = 30(1.2)^t$, where t is the number of weeks.

1 SORT

8 items

Circle the category for each situation, then choose two item numbers and explain, using "same amount added" or "same factor multiplied," how you knew.

1.	A tank contains 40 liters of water and gains 6 liters each minute.	ADDITIVE	MULTIPLY
2.	A bacteria culture triples every hour.	ADDITIVE	MULTIPLY
3.	An investment grows by 4% each year.	ADDITIVE	MULTIPLY
4.	A gym charges an $18 sign-up fee plus $7 for each visit.	ADDITIVE	MULTIPLY
5.	A streaming audience doubles each week.	ADDITIVE	MULTIPLY
6.	A taxi fare begins at $3.50 and adds $2.20 for each mile.	ADDITIVE	MULTIPLY
7.	A runner travels 9 kilometers each hour. Total distance is tracked over time.	ADDITIVE	MULTIPLY
8.	A worker earns $16 per hour, with no starting payment. Total pay is tracked by hours worked.	ADDITIVE	MULTIPLY

2 PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new ADDITIVE situation and one new MULTIPLY situation. In each situation, state what happens when the input increases by 1.

ADDITIVE _____

MULTIPLY _____

CHALLENGE

An account has $200 at month 0, $210 at month 1, $220 at month 2, and $230 at month 3. Write an equation for balance B after m months, then name its category. Assume the balance continues increasing by $10 each month.

ANSWER KEY

Rate Pattern Sort

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	A tank contains 40 liters of water and gains 6 liters each minute.	**ADDITIVE**	The amount increases by 6 liters for every 1 minute.
2	A bacteria culture triples every hour.	**MULTIPLY**	Each hour, the amount is multiplied by 3.
3	An investment grows by 4% each year.	**MULTIPLY**	Each year, the value is multiplied by 1.04.
4	A gym charges an $18 sign-up fee plus $7 for each visit.	**ADDITIVE**	The total cost adds $7 for every visit.
5	A streaming audience doubles each week.	**MULTIPLY**	Each week, the audience is multiplied by 2.
6	A taxi fare begins at $3.50 and adds $2.20 for each mile.	**ADDITIVE**	The fare increases by the same $2.20 for every mile.
7	A runner travels 9 kilometers each hour. Total distance is tracked over time.	**ADDITIVE**	Total distance adds 9 kilometers for every hour.
8	A worker earns $16 per hour, with no starting payment. Total pay is tracked by hours worked.	**ADDITIVE**	Total pay adds $16 for every hour.

PART 2 · PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **ADDITIVE**: A library receives 25 new books each month, so its total number of books increases by 25 for each month.
- **MULTIPLY**: The number of shares of a post is multiplied by 1.25 each day.

Challenge: B = 200 + 10m; ADDITIVE.

Items 1, 4, 6, 7, and 8 are ADDITIVE. Items 2, 3, and 5 are MULTIPLY. Accept proof explanations that identify equal-interval addition or subtraction versus equal-interval multiplication.