Rate or Not?

Sort output patterns and connect them to graphs.

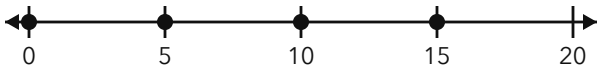
7.A.1 "Explain the concept of proportionality in mathematical models and situations and distinguish between proportional and non-proportional relationships. Identify a relationship between two varying quantities, x and y..."

NAME _____ DATE _____

PROPORTIONAL

The output is 0 when the input is 0. Each time the input rises by 1, the output changes by the same amount, r. Its graph is a line through (0, 0) and (1, r). The output can increase or decrease.

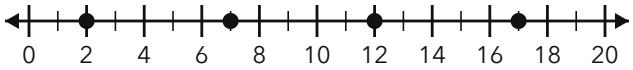
A garden starts with no flowers and gains 5 flowers each day. The marked outputs are 0, 5, 10, and 15.



NOT PROPORTIONAL

The output does not start at 0, or it does not change by the same amount each time the input rises by 1. Its graph is not a line through the origin.

A jar starts with 2 buttons and gets 5 more each day. The marked outputs are 2, 7, 12, and 17.



1 SORT

8 items

SORT: Each number line marks the outputs for inputs 0, 1, 2, and 3 from left to right, so circle a category for each figure; PROVE IT: choose one figure from each category and explain how you knew.

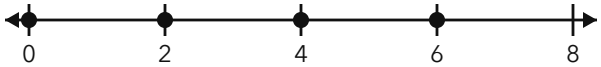
1. 

Figure 1 **YES** **NO**

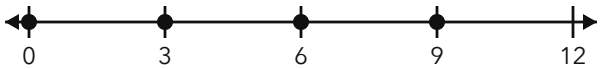
2. 

Figure 2 **YES** **NO**

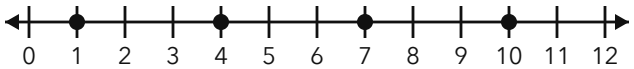
3. 

Figure 3 **YES** **NO**

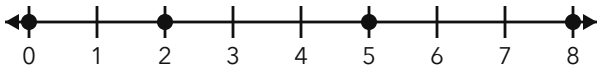
4. 

Figure 4 **YES** **NO**

5.

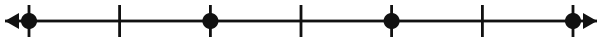


Figure 5

YES **NO**

6.

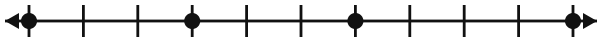


Figure 6

YES **NO**

7.

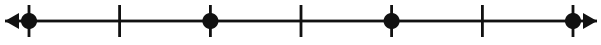


Figure 7

YES **NO**

8.

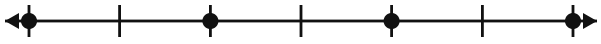


Figure 8

YES **NO**

2 PROVE IT

Explain your thinking

Choose one figure from each category and explain how you knew.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

MAKE YOUR OWN: Write four outputs for inputs 0, 1, 2, and 3 that form a new example of each category, and explain each choice briefly.

YES _____

NO _____

CHALLENGE

Choose a proportional figure from Part 1, give its unit rate r, and name the points (0, 0) and (1, r) on its graph. What does the graph look like?

ANSWER KEY # Rate or Not?

GRADE 7 · 7.A.1

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Figure 1 (numberline)	**YES**	Starts at 0 and increases by 2 for each input.
2	Figure 2 (numberline)	**YES**	Starts at 0 and increases by 3 for each input.
3	Figure 3 (numberline)	**NO**	Increases by 3, but the output at input 0 is 1.
4	Figure 4 (numberline)	**NO**	Starts at 0, but the changes are 2, 3, and 3.
5	Figure 5 (numberline)	**YES**	Starts at 0 and increases by 4 for each input.
6	Figure 6 (numberline)	**NO**	Starts at 0, but the changes are 3, 3, and 4.
7	Figure 7 (numberline)	**YES**	Starts at 0 and increases by 6 for each input.
8	Figure 8 (numberline)	**YES**	Starts at 0 and increases by 8 for each input.

PART 2 · PROVE IT

Task: Choose one figure from each category and explain how you knew.
Accept an explanation that answers every part of the task and identifies the deciding feature for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **YES**: Proportional: 0, 7, 14, 21. It starts at 0 and increases by 7 each time.
- **NO**: Not proportional: 4, 8, 12, 16. It increases by 4 each time, but it starts at 4 instead of 0.

Challenge: Figure 1 has a unit rate of 2. Its graph is a line through (0, 0) and (1, 2).

For PROVE IT, look for an explanation of both the starting output and the changes between outputs. A proportional figure starts at 0 and has equal changes; a non-proportional figure fails at least one condition.