

Starting With A Rule

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Summary	Students focus on whether given outputs are consistent with a given rule.
Goals	1. To move away from the convention of always starting from a story or narrative. This has to do with the general shift from semantically driven problem solving toward syntactically driven problem solving. Starting from a rule, can the students check to see whether the data in the table are consistent?
Materials	Overheads, White Board or Chart Paper, Handouts
Keywords	Full Class Discussion Interpretation of Equations Interpretation of Tables Linear Functions Production of Tables Small Group Work Solving Equations

Activity Plan:

Introducing the Problem

1. Representing the Two Options as Patterns [Whole Class]

The task for students is to decide whether a given rule could have generated the values in a table.

The table has two columns, one containing values of d , the other those of m .

To kick off discussion, try to spend a little time trying to contextualize the problem in a story narrative. But don't go through the story for each row.

d	m
1	10

Ask children to guess what the rule might be to get from the amount of days to the amount of money. Possible guesses may be: add 9, multiply by 10, or others. Can you know what the rule is from two values?

Now complete the table slowly using the overhead on page 1.

See if the children start to anticipate what values of m will be next.

Give them enough time to think, especially for the last two rows.

d	m
1	10
2	13
3	16
4	19
5	22
100	307
0	7

Ask and discuss the following questions:

- What can you do to the input number to make the output number?
- How can the value of d become the value of m ?
- How do you get from the number of days to the amount of money?
- What do you have to do to the number in column 1 to find out the number that goes into column 2?

Tell them the rule, if they haven't already identified it as $d \rightarrow d \times 3 + 7$, and ask them to fill out additional values in the table.

2. Checking Whether a Rule Was Consistently applied [Group Work]

The handout on page 2 shows a table that "Matthew" filled out. He tried to use the same rule, namely, $d \rightarrow d \times 3 + 7$.

The job of the students is to judge where he gave correct answers, and where he gave wrong answers.

3. Discussion of Handout [Whole Class]

Go through the table children used in the handout. For each row, ask them to explain whether:

- The numbers follow the rule.
- Whether Matthew got it right or got it wrong.
- If wrong, what he should have written.

4. Homework (Page 3)

Students work on a very similar problem with the rule $z = (r \times 5) + 3$.

<i>d</i>	<i>m</i>
1	10

Name: _____ Date: _____

A boy named Matthew was told to make a table using the following rule:

$$m = (d \times 7) + 2$$

For each row, circle whether Matthew's answer is correct or incorrect

An answer is "correct" if it follows the rule above.

An answer is "wrong" if it does not follow the rule above.

Show whether you get the same value of m that Matthew got.

Row	d	m (Matthew's answer):	(circle one)	$(d \times 7) + 2 = m$
1	2	13	correct incorrect	$(2 \times 7) + 2 = 13$
2	3	16	correct incorrect	
3	4	19	correct incorrect	
4	5	21	correct incorrect	
5	100	307	correct incorrect	
6	200	603	correct incorrect	
7	300	907	correct incorrect	
8	1000	170	correct incorrect	

Name: _____ Date: _____

Sarah was told to make a table using the following rule:

$$m = (d \times 5) + 3$$

For each row, circle whether Sarah's answer is correct or incorrect.

An answer is "correct" if it follows the rule above.

An answer is "wrong" if it does not follow the rule above.

Show whether you get the same value of m that Sarah got.

Row	d	M : (Sarah's answer)	(circle one)	$(d \times 5) + 3 = m$
1	2	13	correct incorrect	$(2 \times 5) + 3 = 13$
2	3	18	correct incorrect	
3	4	23	correct incorrect	
4	5	25	correct incorrect	
5	100	503	correct incorrect	
6	20	103	correct incorrect	
7	30	135	correct incorrect	
8	0	3	correct incorrect	