

Rules and Formulas

Rules and Formulas

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Summary	Students are given a rule and a data table supposedly generated according to the rule. Students evaluate whether: (1) the proper rule has been applied and (2) the result is correct.
Goals	1. The task should push the students to articulate knowledge that they have so far only been required to display in action. Another student's calculations become the object of reflection.
Materials	Overheads, White Board or Chart Paper, Handouts
Keywords	Contextualized Situations Full Class Discussion Interpretation of Algebraic Expressions Interpretation of Equations Interpretation of Stories Interpretation of Tables Interpretation of Visual Patterns Number Lines Production of Tables Solving Equations

Activity Plan:

1. Rules & Formulas [Whole Class]

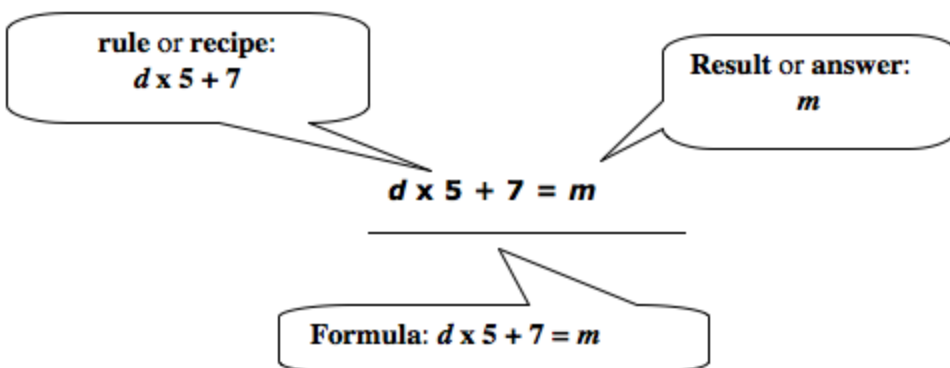
Spend some time reviewing the notion of rules in patterns of dots, tables hops on a number line, story, and mathematical expression (using the overheads on pages 1-2).

Notice that each of the examples in the overhead expresses the **same rule!** See if the students understand this.

Then spend some time introducing some new terms: formula and recipe especially.

2. Checking Geraldo's Work

Use the overhead on page 3 to discuss the terms formula and recipe in the context of Geraldo's work.



The job of the students on the handout (page 4) is to judge where Geraldo gave correct answers, and where he gave wrong answers. But we want them to distinguish whether he chose the correct rule or not, independently of his answer.

Note that, if Geraldo follows the recipe, he should get a correct answer for each case.

<i>d</i>	<i>m</i> (result)	What <u>Geraldo</u> wrote	Did Geraldo use the correct <u>rule</u>? (yes or no)	What you would have written?	Did you get the same result as Geraldo?
4	27	$4 \times 5 + 7 = 27$	yes	$4 \times 5 + 7 = 27$	yes
10	1	$10 \times 5 + 7 = 1$	yes	$10 \times 5 + 7 = 57$	no
3	23	$3 \times 7 + 5 = 28$	no	$3 \times 5 + 7 = 22$	no
8	43	$8 + 7 + 5 = 20$			
6	37	$5 \times 6 + 7 = 37$			
2	17	$7 + 2 \times 5 = 17$			

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

- The numbers follow the rule.
- Geraldo got it right or got it wrong.
- What he should have written.

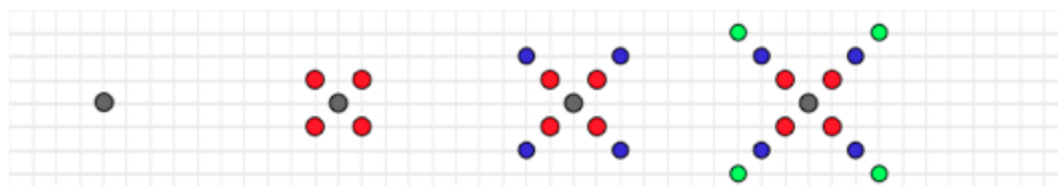
3. Homework (Page 5)

The homework continues the work done in the lesson but it also uses a rule related to place value.

Students should note that all of the correct answers should end in 6.

They should also note that, if you remove the final 6, the number remaining will be k , that is, the number of times 10 was added to the 6.

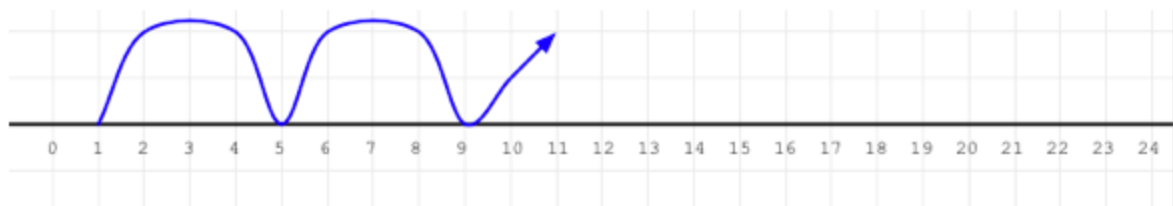
You can make a **pattern of dots** that follows a rule...



You can make a **table** that follows a rule...

Day	Amount
0	1
1	5
2	9
3	13
4	

You can take **hops** on a number line that follow a rule...



You can tell a **story** about a rule...

“Before Tom started working, he had \$1.00 in his piggy bank.
Then he earned \$4.00 for each day of work.”

You use a **mathematical expression** to show a rule...

$$d \times 4 + 1$$

rule or **recipe**:

$$d \times 5 + 7$$

result or **answer**:

m

$$d \times 5 + 7 = m$$

Formula: $d \times 5 + 7 = m$

Name: _____ Date: _____

Geraldo was told to make a table using the following formula:

$$\textcircled{d \times 5 + 7} = \textcircled{m}$$

the rule the result

<i>d</i>	Geraldo filled in the formula like this...	Did Geraldo correctly use the <u>rule</u> ? (yes or no)	What you would have written?	Did you get the same result as Geraldo?
4	$4 \times 5 + 7 = 27$			
10	$10 \times 5 + 7 = 52$			
3	$3 \times 5 + 7 = 22$			
8	$8 + 5 + 7 = 20$			
6	$6 \times 5 + 7 = 37$			
2	$2 \times 5 + 7 = 16$			
0	$0 \times 7 + 5 = 7$			
1	$1 \times 5 + 7 = 12$			

Name: _____ Date: _____

Marcia was told to make a table using the following formula:

$$\text{the rule } (k \times 10 + 6) = \text{the result } m$$

k	Marcia filled in the formula like this...	Did Marcia correctly use the rule?	What you would have written?
0	$0 \times 10 + 6 = 6$		
1	$1 \times 10 + 6 = 16$		
2	$2 \times 10 + 6 = 25$		
3	$3 + 10 + 6 = 36$		
4	$4 \times 10 + 6 = 46$		
5	$5 \times 10 + 6 = 53$		
6	$6 \times 10 + 6 = 66$		
7	$7 \times 10 + 6 = 76$		

What do you notice about all of the correct answers?

What is the value of k when the answer is 96?What is the value of k when the answer is 136?