Mathkind

JAGLAVAK VS TERMITES: EXPONENTIAL GROWTH

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Among the inhospitable mountains of northern Cameroon live the Mofu people. Calling themselves "People of the Rock," their primary pursuit is harmony with nature. You may have friends who like to take walks on the weekends or plant petunias by their patios, but have you ever known someone who befriended a beetle? The Mofu have a unique way of interacting with their environment: they connect with insects.

That's right. Not only do the Mofu eat their six-legged neighbors as a source of protein, but they also keep insects as pets. Human supremacy isn't always the rule, however, because during droughts, one species of insect, namely termites, turns on their Mofu cohabitants.

Dlirba has noticed 16 termites around this hut and believes he might need the Jaglavak's help. The termite population is growing by 50 percent each week, and in the second week, he counts 24 termites.

STEP 1

In the table record the total number of termites at the end of each week of four weeks.

Weeks elapsed	Total number of termites	Increase in the number of termites (rate of change per week)	Ratio of this week's total to last week's total
Start (0)	16		
1		8	
2			
3			
4			

STEP 2

The increase in the number of termites each week is the population's rate of change per week. Calculate each rate of change and record it in your table. Does the rate of change show a linear pattern? Why or why not?

STEP 3

Let *x* represent the number of weeks elapsed, and let *y* represent the total number of termites. Graph the date using (0,16) for the first point. Connect the points with line segments and describe how the slope changes from point to point.
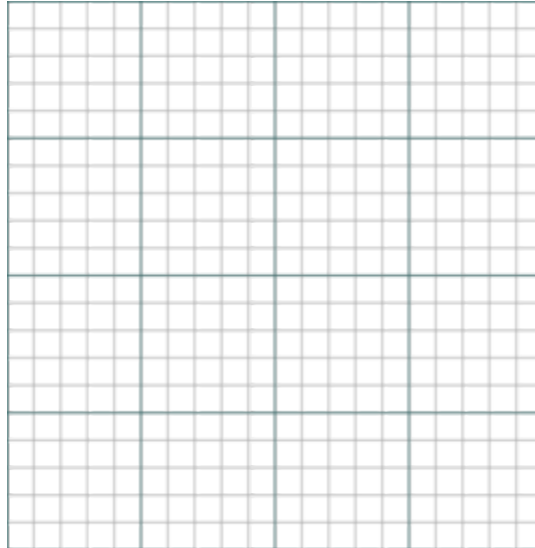
STEP 4

Calculate the ratio of the number of termites each week to the number of termites the previous week, and record it in the table. For example, divide the population after one week has elapsed by the population when 0 weeks have elapsed. Repeat this process to complete your table. How do these ratios compare? Explain what these ratios tell you about termite population growth.

STEP 5

What is the constant multiplier for the termite population? How can you use this number to calculate the population when five weeks have elapsed?

STEP 6

Model the population growth by writing a recursive routine. Describe what each part of this calculator command does.

STEP 7

Press ENTER a few times to check that your recursive routine gives the sequence of values in the "Total number of termites" column in your table. Use the routine to find the termite population at the end of weeks five to eight.

STEP 8

What is the termite population after 20 weeks have elapsed? After 30 weeks have elapsed? What happens in the long run?