What Is The Next One?

Teacher Notes

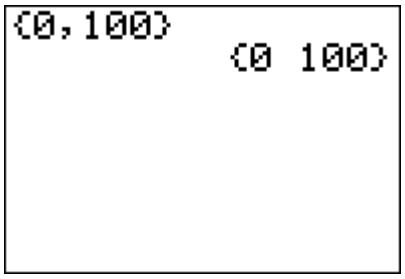
Sometimes the easiest way to solve a problem is not to find a function rule or equation. It is simpler to "find the next one" until you get the answer you need. Using this recursive thinking can be efficiently demonstrated using the home screen of the graphing calculator.

Look at the problem below.

Ex: Jack was given $100 as a gift and he decided to put the money in a savings account and to add $27 per month from the money he gets from mowing lawns. If he continues with this savings plan, when will he have enough money to pay $687 including tax for a new stereo system?

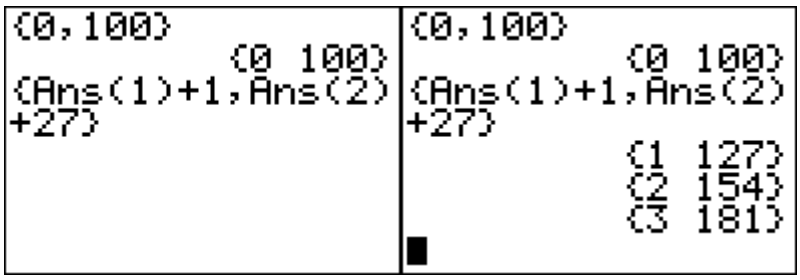
One way to find the answer to this question is to use the { } notation on the home screen to find the amount of money in the account for each month until he has enough to make his purchase.

First, you establish the initial value in the account. Before any months have passed (at 0 months), the amount of money in the account is $100. Using the correct notation, this value is entered on the home screen (note the comma).

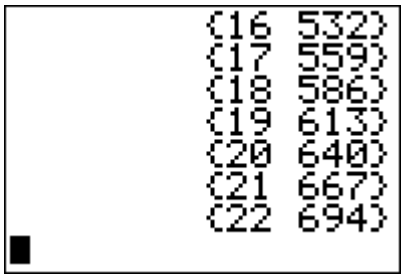


To enter the recursive pattern, the { } are used as well and the change for both values need to be indicated. The notation indicates that the answer in the first position (months) increases by 1 for each month that passes and the answer in the second position (amount in the account) increase by $27 each month.

Students will likely need help with the use of the comma to separate the arguments in the braces and with the way to generate the "next" terms in both of the positions.



Each time you press the enter key, the recursive pattern generates a counter showing the number of months that have passed and the amount of money in the account after the deposit.



Students will need to recognize that, in this situation, the amount in the account will never be exactly the amount of the purchase but they need to give the "real-world" answer to the question.

Continuing to enter until enough money is in the account, you can see that in the 22nd month, Jack will have enough money to purchase the stereo.

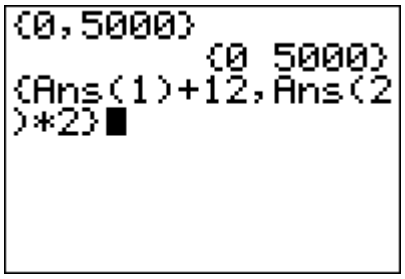
See if you can use this process to find the answers to the questions given below.

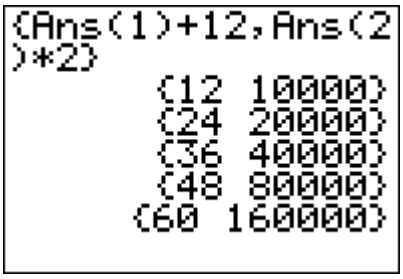
15 Mr. Collins invested some money that will double in value every 12 years. If he invested $5,000 on the day of his daughter's birth, how much will the investment be worth on his daughter's 60th birthday?

A $300,000
B $160,000
C $80,000
D $320,000

What recursive pattern did you use to find the answer?

The initial value will be {0, 5000} meaning 0 months and $5000 as the beginning amount. One way the process can generate the values is to increase the number of years by 12 and to double the amount of money for each of those 12-year periods.





When his daughter is 60, the account will have $160,000.

17. A biologist noticed that the population of ladybugs in a sample doubled every 3 days. If the initial population sample was 30 ladybugs, what was the population of ladybugs at the end of 9 days?

A 90
B 270
C 120
D 240

What recursive pattern did you use to find the answer?

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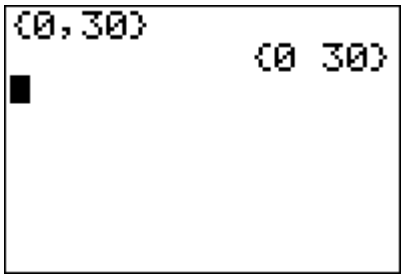

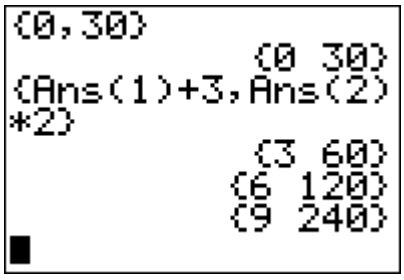

At the end of 9 days, there will be 240 ladybugs.