

Exploration 14-3a: Introduction to Series

Date: _____

Objective: Find partial sums of a series for which a formula for t_n is known by adding up the terms.

1. Write out the indicated terms of this series.

$$\sum_{k=1}^6 3k + 5$$

2. Evaluate the partial sum in Problem 1.

3. Enter a program into your grapher to calculate the partial sum of a series. The formula for t_n should be entered as y_1 . When the program runs, your grapher should ask you to input the number of terms. Then it should calculate and display each partial sum up to the one you asked for. Test your program by using it to find the partial sum in Problem 1. You may assume that the program is working correctly if it gives the answer you got in Problem 2.

4. Use your program from Problem 3 to evaluate S_{100} for the series in Problem 1. That is, find

$$\sum_{k=1}^{100} 3k + 5$$

5. Figure out a formula for t_n for this next series. Then use your program in Problem 3 to find the fifth partial sum, S_5 , for the series. Confirm that the program gives you the correct answer by actually adding the terms shown here.

$$2 + 5 + 10 + 17 + 26 + \cdots$$

6. Use your program to calculate the 50th partial sum for the series in Problem 5.

7. Write out the first four terms of the geometric series with first term 1000 and common ratio 1.06. Calculate the fourth partial sum by adding up these terms.

8. Write a formula for the n th term of the geometric series in Problem 7. Confirm that your formula is correct by using the program of Problem 3 to find the fourth partial sum you calculated manually in Problem 7.

9. Use your program to find the 30th partial sum of the geometric series in Problem 7. (This number is the amount of money you would have at the end of 30 years if you invested \$1000 a year in a savings account that pays an interest of 6% per year, compounded annually.)

10. Calculate the following partial sums of the geometric series with first term 800 and common ratio 0.9.

$$S_{10} \underline{\hspace{2cm}}$$

$$S_{20} \underline{\hspace{2cm}}$$

$$S_{50} \underline{\hspace{2cm}}$$

$$S_{100} \underline{\hspace{2cm}}$$

$$S_{200} \underline{\hspace{2cm}}$$

11. The partial sums in Problem 10 **converge to 8000**. What do you think this means?
12. What did you learn as a result of doing this Exploration that you did not know before?