Geometric Series

Name _____

Class _____

Problem 1 – Infinite series

1. Find the next three terms of the infinite series

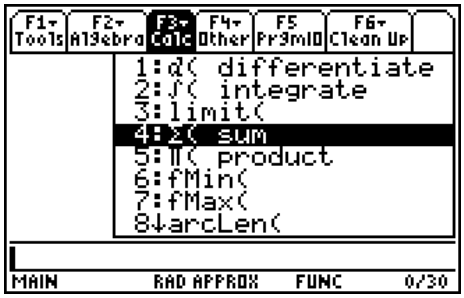
a. $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots$ **b.** $\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\ldots$ **c.** $2+\frac{3}{2}+\frac{9}{8}+\ldots$

Hint: Divide each of the terms by the first term. What do you notice?

2. Write an expression in terms of *n* that describe each of the above series using sigma notation.

Problem 2 – Finding the sum of a geometric series

Find the sixth partial sum of two geometric series. To find the sum of a series, go to **F3:Calc** and select **Σ(sum**.



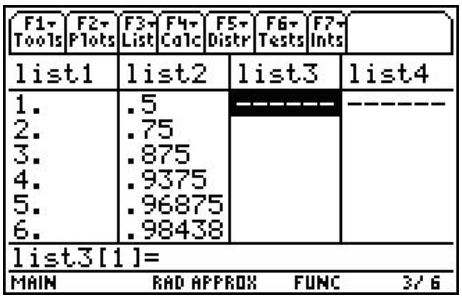
3. $\sum_{n=1}^{6}\left(\frac{1}{2}\right)^{n}=$

4. $\sum_{n=1}^{6}2\left(\frac{3}{4}\right)^{n-1}=$

Problem 3 – Convergence and divergence of geometric Series

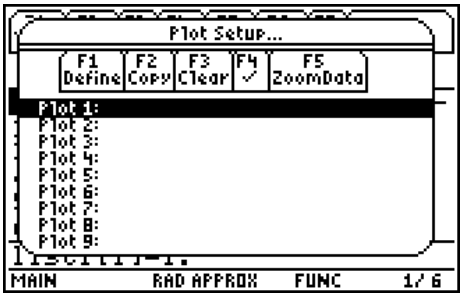
Use the **Stats/List Editor** application to display the terms of each series

5. $\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n}$ **6.** $\sum_{n=1}^{\infty}2\left(\frac{3}{4}\right)^{n-1}$ **7.** $\sum_{n=1}^{\infty}\frac{2}{3}\left(\frac{3}{2}\right)^{n-1}$



Study this data. What do you notice about the terms?

Graph each of series.



Select **Stats/List Editor** from the *Apps desktop*.

In **list1**, enter **seq(x,x,1,50)**. This function can be found by pressing CATALOG and scrolling down.

In **list2,** use $\sum$ **((.5)^x,x,1,list1)**. This will list the first 50 partial sums of the series. Repeat these steps for questions 6 and 7.

To create a scatter plot, select **F2:Plots > 1:Plot Setup**, then press **F1** to define the graph. Select **list1** for *x* and **list2** for *y*, and press ENTER. To view the graph, select **F5:ZoomData**.

Sketch each graph below.

Decide if each geometric series converges or diverges. If the series converges, give your best guess as to its value.