

The Problem Set

In finding sums and terms, show that you're using formulas rather than just simply doing all the work on your calculator. When working with money, round off the final answer to the nearest penny. Of course, a calculator double-check is a fun way to check to see if your theory is on the mark.

1. Write out the first 6 terms of a geometric sequence whose first term is 5 and the ratio is 3. Give the formula for this sequence. Use your formula to find the 17th term. Find the sum of the first 12 terms using the formula for the sum of a geometric sequence.
2. Write out the first 6 terms of a geometric sequence whose first term is 9 and the ratio is $1/2$. Give the formula for this sequence. Use this formula to find the 11th term. Find the sum of the first 8 terms using the formula for the sum of a geometric sequence.
3. Give the formula for the geometric sequence whose first term is 7 and ratio is $-1/2$. Find the sum of the first 20 terms of this sequence. Give an answer to the full accuracy of your calculator and also try to give an exact answer as a fraction.
4. If inflation causes the value of a house to increase about 8% per year, what would a house that is worth \$120,000 today, cost in 9 years? Give a formula for the cost of the house n years from now. What is the ratio r for this geometric sequence?
5. Write the first 6 terms of a geometric sequence whose first term is -2 and whose ratio is $-$. Find the sum of the first 8 terms. Find the sum of the first 29 terms.
6. A famous problem goes as follows: Bob tells his boss he will work for "pennies" every day during the month of April. On April 1st he will work for 1 cent. The next day he will work for 2 cents, the next day for 4 cents, the next day for 8 cents, etc. The boss, being greedy (but who slept through business math, readily agrees). How much does Bob earn on the last day of April? What is the total of all of Bob's wages for the month of April? (Express your final answers in dollar format - i.e. if answer was 867 cents, express answer as \$8.67).
7. A \$5,000 loan taken out on the first of March is being repaid to a friend (no interest is being charged) by making monthly payments of 12% of the unpaid balance. You will make your payments on the first day of the following months. Write several terms of a sequence called B that indicates the unpaid balance at the beginning of each month (right after you make the payment). Start your sequence with $B_1 = 4400$. (The balance after the first payment.) I got this by taking 12% of 5000 and figuring out what was left. Is this a geometric sequence? If so, what is the ratio? What is the unpaid balance after 1 year? (Write the formula for the unpaid balance B in terms of n , the number of months you made a payment.) Using logarithms, find the number of months it will take before the unpaid balance reaches \$10; reaches \$1.