Money in a savings account usually earns either *simple* or *compound* interest. For example, suppose you invest $100 and earn 5% interest per year. If you earn *simple* interest, you will earn $5 for every year that the money is invested, since 5 is 5% of 100. If you earn *compound* interest, you will earn $5 for the first year the money is invested. In the next year, if you keep the entire $105 in the bank, you will earn 5% interest on $105. In other words, compound interest pays you interest on the interest as well as on the original investment.

The table shows what would happen to your investment in both cases for the first few years.

Total account balance, with:

Year	Simple interest	Compound interest
0	100	100
1	105	105
2	110	110.25
3	115	115.76

1. a. With simple interest, your account balance for each year can be obtained by *adding* a certain amount to the amount from the previous year. Find this amount.
   b. With compound interest, your account balance for each year can be obtained by *multiplying* by a certain amount each year. Find this amount.

2. Write two equations (one for simple interest and one for compound interest) giving the account balance as the function of the year for:

a. 5% interest on the amount $100;
b. 12% interest on the amount $100;
c. 12% interest on the amount $500.

3. **Report** Write a report comparing simple and compound interest. Your report should include, but not be limited to, the following:
   • Equations for simple and compound interest that give the account balance as a function of time invested. Show how to change the equations if you change the amount of money invested or the interest rate. Explain how you figured out the equations.
   • A comparison of how the amount in the account grows in each case. Which grows linearly and which grows exponentially? Explain how you know.
   • An analysis of an example: Choose an amount to invest and an interest rate, and make a table or graph comparing the amount you would have in the account with simple and with compound interest. Assume you leave the money and the interest in the account for 25 years. Use a graph to illustrate.

4. ♡ Find a formula for the difference in the account balance after n years for two accounts that start with an original investment of s dollars at p percent interest, if one account earns simple interest and the other earns compound interest.

5. ♡ Say you have some money invested at 7% compound interest. How many *months* does it take for your investment to double? (Find a formula, then use decimal exponents on your calculator to find out what fraction of a year past a whole number of years it will take.)