

INVESTIGATION

Sequence Applications

1. Seven houses each contain seven cats. Each cat kills seven mice. Each mouse had eaten seven ears of grain. Each ear of grain would have produced seven hekats of wheat. (The hekat was an ancient Egyptian volume unit used to measure grain, bread, and beer.)

- a. Complete the table below.

houses	cats	mice	Ears of grain	hekats

- b. What type of sequence is shown in the table above?

- c. What math is involved in moving from one term of the sequence to the next?

2. Suppose a couple begins saving for their children’s college tuition when the child is an infant. They invest \$15,000 on the day the baby is born in an account that pays 4.5% annual interest at the end of the year.

- a. Complete the table below regarding the value at the beginning of each year.

Value Year 1	Value Year 2	Value Year 3	Value Year 4	Value Year 5

- b. What type of sequence is shown in the table above?

- c. What math is involved in moving from one term of the sequence to the next?

- d. How much will the investment be worth on the baby’s 10th birthday?

- e. The couple wants to save at least \$40,000 by the time their child starts college. How long will it take this investment to be worth \$40,000

3. A ball is dropped from a height of 240 cm. It bounces up to 80% of the previous height on every bounce.
- Draw a picture.

b. On your diagram, label the maximum height after each bounce.

c. What type of sequence is shown in the table above?

d. What math is involved in moving from one term of the sequence to the next?

e. How high does the ball bounce after the 4th bounce?

f. How many bounces would it take for the ball to bounce to a height of less than 10 cm?

4. Your favorite radio station, WCPM, is having a contest. The DJ poses a question to the listeners. If the caller answers correctly, he or she wins the prize money. If the caller answers incorrectly, \$30 is added to the prize money and the next caller is eligible to win. The current question is difficult, and no one has won for two days.

a. Complete the table below if the initial prize money is \$P

First caller	Second caller	Third caller	Fourth caller	Fifth caller

a. What type of sequence is shown in the table?

b. After 15 people already called in a single day with incorrect answers, you called in with the correct answer and won \$506! How much was the initial prize money?

c. Suppose the contest always starts with \$100. How many people would have to guess incorrectly for the winner to get \$790?