

Looking for a Pattern

The study of mathematics is often called the study of **patterns**. Patterns show up everywhere around us. In everyday life, we see thousands of patterns: wallpaper, traffic, automobile designs, weekday afternoon TV schedules, cabinet door arrangements, swimming pool tiles, fence links, and much more. In mathematics, patterns can repeat and extend indefinitely.

As a problem-solving strategy, recognizing patterns enables you to reduce a complex problem to a pattern and then use the pattern to form a solution. Often the key to finding a pattern is organizing information.

A **sequence** is an ordered string of numbers tied together by a consistent rule, or formula that determines the next term in the sequence. A **term** is an individual member of a sequence.

Hints

The key to finding most patterns is to organize a problem's information in a chart, table, or other systematic list so that the patterns jump you at you.

- Write down the sequence, and extend it if you can.
- Make a chart that matches each element of the sequence with its position number in the sequence.
- Check the differences between the terms and try to relate the *terms* to their position numbers.
- If seeing the differences doesn't help, try other operations such as multiplication, division, and squaring, or use a combination of operations.
- Patterns turn up in many places. Keep your eyes open for them.

Dogs

Shawna liked to jog in the late afternoon. One day she noticed an unusual phenomenon. As she jogged, dogs would hear her and bark. After the first dog had barked for about 15 seconds, two other dogs would join in and bark. In about another 15 seconds, it seemed that each barking dog would ‘inspire’ two more dogs to start barking. Of course, long after Shawna passed the first dog, it continued to bark, as dogs are inclined to do. After about 3 minutes, how many dogs were barking (as a result of Shawna’s passing the first dog)? Work this problem before continuing.

PETTER RABBIT

Tessa wanted to buy a rabbit. She had liked the Easter bunny when she was a kid, so she decided to raise some bunnies of her own. She went to the store with the intention of buying one rabbit, but she ended up with two newborn rabbits, a male and a female. She named them Patrick and Susan. Well, rabbits being what they are (rabbits), it is fairly impossible to have just two rabbits for an extended period of time. She bought them on April 1, 2007. On June 1, she noticed that Patrick and Susan were the proud parents of two newborn rabbits, again one male and one female. She named these new arrivals Thomas and Ursula. On July 1, Patrick and Susan again gave birth to a male and a female rabbit. She named these Vida and Wanda. On August 1, Patrick and Susan again gave birth to a male and a female. But Tessa was really surprised to see that Thomas and Ursula also gave birth to a male and a female. Tessa was running out of names, so she didn’t bother giving them any. On September 1, Patrick and Susan gave birth to a male and a female, and so did Thomas and Ursula, and so did Vida and Wanda, Tessa noticed a pattern to the breeding. A pair of rabbits was born. Two months later they bred a pair of rabbits and continued to breed a pair of rabbits every month after that. Tessa wondered, ‘If this keeps up, how many rabbits am I going to have on April 1, 2008?’

The Stadium

Radio broadcasters joke about the number of people who start leaving Dodger Stadium during the seventh inning of baseball games. One evening, during a particularly boring baseball game in which the Dodgers were trailing by six runs after six innings, the fans began to leave at a record pace. After the first out in the top of the seventh inning, 100 fans left. After the second out, 150 fans left. After the third out, 200 fans left. The pattern continued in this way, with 50 more fans leaving after each out than had left after the previous out. The ridiculous thing was, the Dodgers tied the game in the bottom of the ninth inning, and people still kept leaving early. The game lasted ten innings (the Dodgers lost anyway) and the pattern continued through the bottom of the tenth inning. How many fans left early?