PROBLEM SOLVING

USING THE STRATEGIES

1. **Truck tires** You have a four-wheel drive all-terrain truck, and you need to make a 27 000-km trip. Each tire can be used for 12 000 km. The four tires on the truck are new, and you have five new tires in the back of the truck. How can you use the nine tires to complete the trip?

2. **Marbles** There are twenty marbles in a bag. There are eight yellow marbles, seven purple marbles, and five green marbles. If your eyes are closed, what is the maximum number of marbles you can take from the bag to be certain that you will leave in the bag at least four marbles of one colour and at least three marbles of a second colour?

3. **Equilateral triangles** The length of each side of an equilateral triangle is 2 cm. The midpoints of the sides are joined to form an inscribed equilateral triangle. If this process is continued without end, find the sum of the perimeters of the triangles.

4. **Prime numbers** The number 13 is a prime number in which the two digits are different. Reversing the digits gives 31, another prime number. How many other pairs of numbers containing two different digits, like 13 and 31, are both prime?

5. **Drops of milk** About how many drops of milk are there in a one-litre carton of milk?

6. **Cycling speed** A cyclist rode up a hill at 4 km/h and back down the same route at 12 km/h. If she made the ride without stopping, what was her average speed for the entire ride?

7. **Measurement** The sum of the lengths of the sides of a right triangle is 18 cm. The sum of the squares of the lengths of the sides is 128 cm². What is the area of the triangle?

8. **Cube net** The net shown is folded to make a cube. Name the face that will be opposite the face labelled A.

9. **Books** There were five books in a series. The books were published at six-year intervals. The year the fifth book was published, the sum of the five publication years was 9970. In what year was the first book published?

10. **Perfect squares** The number 144 is a perfect square. The sum of the digits of 144 is 9, which is also a perfect square. How many other three-digit numbers have this property?

11. **Card sales** A gift shop began selling cards on May 1. On May 2, it sold 3 more cards than it did on May 1. This pattern continued, with the shop selling 3 more cards each day than on the previous day. The shop was open every day for 9 straight days. At the end of the day on May 9, it had sold a total of 171 cards in the 9 days. How many cards did the shop sell on May 7?