

**LESSON
7.1****Real-Life Application:
When Will I Ever Use This?**

For use with the lesson "Apply Exponent Properties Involving Products"

Telephone Numbers

Did you ever wonder how you got your telephone number? The North American Numbering Plan (NANP) was invented in 1947. Under the plan, a phone number contained ten digits. The first three digits were the area code, the second three digits were the exchange, and the last four digits were the individual telephone line numbers. Under the original plan, the first number of an area code could not be a 0 or a 1, and the second number had to be a 0 or a 1. Similarly, the first number of the exchange could not be a 0 or 1. This system created 160 possible area codes, of which 144 were assigned throughout North America. Sixteen of the area codes were reserved for special uses, such as emergency and toll-free numbers.

In 1993 the last of the original area codes was assigned, prompting a need for additional area codes. To alleviate the problem, a new area code format was introduced that removed the restriction on the second number of the area code. This adjustment created 640 additional area code possibilities. The demand for new numbers increases daily with the use of phone lines for business lines, faxes, computer modems, cellular phones, and pagers.

The assignment of new area codes had become common across the country. The two most popular methods for assigning new area codes are the overlay and the geographic split. An overlay just adds the new area code to an existing geographical area without changing its original area code. New customers are assigned the new area code and existing customers retain their original number. Although this method is often the least hassle for individual customers and businesses, an overlay will require all customers to dial ten digits for all calls, even local ones. A geographic split, on the other hand, just divides a geographic area into two regions. One section keeps the same area code and the other receives a new one.

In Exercises 1 and 2, use the information above to answer the question.

- 1.** Using the new NANP guidelines, write an expression in exponential form.
 - a.** the possible number of area codes
 - b.** the possible number of exchanges
 - c.** the possible number of individual line numbers
- 2.** Use your answer in Exercise 1 and the multiplication properties of exponents to find each amount. Show your work.
 - a.** the number of possible phone numbers in one area code
 - b.** the number of possible 10-digit phone numbers