1. Fill in the missing information for each tire size. Find the circumference of each tire.

Tire	P245/70R16	P285/75R16
Width (mm)	245 mm	285 mm
Aspect ratio (%)	70 %	75 %
Height (in.) *25.4 mm = 1 in	(.70)245 = 171.5 mm 6.752 in	(.75)285 = 213.75 mm 8.415 in
Diameter (in.) 6.752 16 6.752	16+6.752+6.752 29.504 in	16+8.415+8.415 32.83 in
Circumference (in.) $d\pi$	92.690 in	103.138 in

2. After one rotation of the wheel, how many inches further has the truck with the larger tires traveled than the truck with the factory-installed tires?

3. After one rotation of the wheel, the truck with the larger tires has traveled _____ times

2. After one rotation of the wheel, how many inches further has the truck with the larger tires traveled than the truck with the factory-installed tires?

103.138 − 92.690 = 10.448 in

3. After one rotation of the wheel, the truck with the larger tires has traveled ____ times further than the truck with the factory-installed tires.

103.138 / 92.690 = 1.113

4. Use the results from the table in Question 1 to assist in completing the following statements about the truck after the larger tires have been installed on it.

If the odometer reading is 20000, *you have actually traveled* ____ *miles.*

20000 × 1.113 = 22,260

If the speedometer reading is 60, your actual speed is ____ *miles per hour.*

60 × 1.113 = 67 mph

The following principles apply when determining actual distance and speed traveled according to tire size:

Actual mileage = k • odometer reading (mileage)

Actual speed = k • speedometer reading (miles per hour)

where k = $\dfrac{\text{circumference of bigger tire}}{\text{circumference of factory-installed tire}}$

7. If you were driving in the truck with the larger tires and the speedometer showed a speed of 65 miles per hour, could you be ticketed for exceeding the 65-mph speed limit by more than 5 mph? More than 10 mph? Justify your answers.

$65 \times 1.113 = 72$ mph

8. **REFLECTION:** What is the relationship between the ratio of an actual distance to an odometer distance of 1 mile and the ratio of the circumference of a current tire to the circumference of a factory-installed tire?

9. **EXTENSION:** On your new small car, you replace the factory-installed P185/75R14 tires with slightly larger P205/75R14 tires. Find the missing number in each statement:

If your odometer reading is 2 0 0 0 0 *(miles), you have actually traveled* 20,940 *miles.*

If your speedometer reading is 60, your actual speed is 63 *miles per hour.*

$78.301 = CIR.$

$82.014 = CIR.$

$K = 1.047$

A telephone number in the form *NYZ-ABC-XXXX* has three sections:

NYZ	ABC	XXXX
area code	exchange code	station code

#1

Before 1995, all area codes had the form ***NYZ***, where ***N*** was any digit from 2 to 9 (2-9), ***Y*** was 0 or 1, and ***Z*** was 1-9 if ***Y*** was 0 or ***Z*** was 2-9 if ***Y*** was 1. The restrictions on ***N*** saved 0 for *call operator* and 1 for long-distance calls. In addition, codes such as *800* and *911* were (and still are) used for special purposes.

The restriction that ***Y*** = 0 or 1 was removed in 1995 because all possible area codes had been assigned. Today ***N*** is 2-9, ***Y*** is 0-8, and ***Z*** is 0-9; the exception to these rules are codes of the form 37***Z*** and 96***Z***, which are being reserved for future use. Area codes where ***Y*** = ***Z*** are called *easily recognizable codes* and are often assigned to special services such as *800* and *877*.

$8 \times 1 \times 8 = 64$ (N: 2-9, Y: 1, Z: 2-9)

$8 \times 1 \times 9 = 72$ (N: 2-9, Y: 0, Z: 1-9)

$64 + 72 = 136$

1. How many area codes were possible before 1995?

2. According to the post-1995 rules, how many area codes are possible today?

3. The 7-digit numbers in a given area code have the form ***ABC-XXXX***, where ***X***, ***B***, and ***C***

$8 \times 9 \times 10 = 720 - 20 = 700$ (N: 2-9, Y: 0-9, Z: 0-9)

10

10

3. The 7-digit numbers in a given area code have the form ***ABC-XXXX***, where ***X***, ***B***, and ***C*** can be any digit 0-9 and ***A*** is restricted to 2-9. There are two other restrictions:

- ***B*** and ***C*** cannot both equal 1 since these values are designated for other purposes such as *911* (emergency) and *411* (information), and
- 555-0100 through 555-0199 are reserved for fictional uses such as in television shows or movies.

According to these conditions, how many 7-digit numbers are possible in a single area code?

8 × 10 × 10 × 10 × 10 × 10 × 10

A: 2-9 B: 0-9 C: X X X X

8,000,000

8,000,000
− 80,000
7,920,000
− 100
7,919,900

Student: _____ Class: _____ Date: _____

Analyzing Numerical Data: Estimating Large Numbers

LA Student Activity Sheet 3: Not Enough Numbers

4) 700 × 7,919,900 =