

**MILEAGE MEASUREMENTS****Determination of Mileage**

Message Toll Telephone prices are based on the airline distance between price centers. In general, each point (city, town or locality) is designated as a price center; certain small towns or localities are assigned adjacent price centers with which they are closely associated for communication purposes or by community of interest.

For the purpose of determining airline distance between price centers, vertical and horizontal grid lines have been established across the United States. The distance between adjacent vertical grid lines and between adjacent horizontal grid lines is the square root of .1 mile. Four digit vertical (V) and four digits horizontal (H) coordinates are computed for each price center from its latitude and longitude location by use of appropriate map-projection equations. The location of a price center is identified by a pair of V-H coordinates which locate a price center within an area of 1/10 of a square mile. V&H coordinates are obtained from the Terminating Point Master (TPM). The TPM is a subsystem of the Bellcore Rating Administrative Data System (BRADS), a nationwide database maintained by Bell Communications Research, Inc. (Bellcore), Morristown, New Jersey.

Price distance between any two price centers is determined as follows:

- Obtain the "V" and "H" coordinates for each price center.
- Obtain the difference between the "V" coordinates of the two price centers. Obtain the difference between the "H" coordinates.

Note: The difference is always obtained by subtracting the smaller coordinate from the larger coordinate.

- Divide each of the differences obtained in the preceding step by three, rounding each quotient to the nearest integer.
- Square these two integers and add the two squares.

If the sum of the squares is greater than 1777, divide the integers obtained in the preceding step by three and repeat this step. Repeat this process until the sum of the squares obtained in this step is less than 1778.

**MILEAGE MEASUREMENTS (cont'd)**

**Determination of Mileage (cont'd)**

- The number of successive divisions by three in the preceding two steps determines the value of "N". Multiply the final sum of the two squares obtained in the preceding step by the multiplier specified in the following table for this value of "N" preceding.

<u>N</u>	<u>Multiplier</u>	<u>Minimum Price Mileage</u>
1	0.9	-
2	8.1	41
3	72.9	121
4	656.1	361

- Obtain square root of product in the preceding step and, with any resulting fraction, round up to next higher integer. This is the message price mileage except that when the mileage so obtained is less than the minimum price mileage shown in the preceding step, the minimum price mileage corresponding to the "N" value is applicable.

Example:

Respective V and H Coordinates

	<u>V</u>	<u>H</u>
Indianapolis	6272	2992
Muncie	6130	2925
Difference:	142	67

Dividing each difference by 3 and rounding to nearer integer = 47 and 22

**MILEAGE MEASUREMENTS (cont'd)**

**Determination of Mileage (cont'd)**

Squaring integers and adding:

$$\begin{array}{r} 47 \times 47 = 2209 \\ 22 \times 22 = \underline{484} \\ \text{Sum of squared integers} = 2693 \end{array}$$

Sum is greater than 1,777, so divide integers in the preceding step by three and repeat the preceding step.

Dividing integers obtained from the preceding division by three and rounding = 16 and 7

Squaring integers and adding:

$$\begin{array}{r} 16 \times 16 = 256 \\ 7 \times 7 = \underline{49} \\ \text{Sum of squared integers} = 305 \end{array}$$

This sum of integers is less than 1,778 and was obtained after two succession divisions by three; therefore, "N" = 2

Multiply final sum of squared integers by factor 8.1 (corresponding to "N" = 2):

$$\begin{array}{r} 305 \\ \times 8.1 \\ \hline 2470.5 \end{array}$$

Square root of 2470.5 = 49.70, which is rounded up to 50 miles. (Fractional miles are always considered full miles.) The message price mileage is 50 miles.