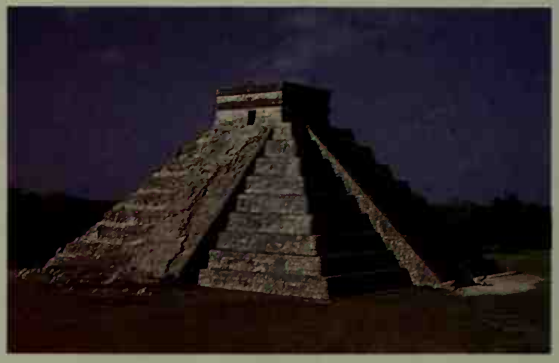
♦ Calculator Key-In

The Great Pyramid of King Cheops has a square base with sides 755 feet long. The original height was 481 feet, but the top part of the pyramid, which was 31 feet in height, has been destroyed. Approximately what percent of the original volume remains? Answer to the nearest hundredth of a percent.

♦ Computer Key-In



The earliest pyramids, which were built about 2750 B.C., are called *step pyramids* because the lateral faces are not triangles but a series of great stone steps. To find the volume of such a pyramid it is necessary to find the sum of the volumes of the steps, or layers. Each layer is a rectangular solid with a square base.

Let us consider a pyramid with base edges 10 and height 10. Suppose that this pyramid is made up of 10 steps with equal heights. The top layer is a cube (base edges equal the height), and the base edge for each succeeding layer increases by an amount equal to the height of a layer. As the left side of the diagram at the bottom of this page shows, the height of each step is $\frac{10}{10} = 1$, and the volume of the top layer is $V_1 = Bh = (1^2) \cdot 1 = 1$. The volumes of the second and third layers are $V_2 = (2^2) \cdot 1 = 4$ and $V_3 = (3^2) \cdot 1 = 9$, respectively. Continuing in this way, the total volume of the pyramid is:

$$V = 1^2 \cdot 1 + 2^2 \cdot 1 + 3^2 \cdot 1 + 4^2 \cdot 1 + \cdots + 9^2 \cdot 1 + 10^2 \cdot 1 = 385$$