Now consider another pyramid with the same base and height but having 100 steps instead of 10 steps. The height of each layer is $\frac{10}{100} = \frac{1}{10}$, and the volume of each layer is computed using the formula $V = Bh$:

$$\text{Volume of top layer} = \left(\frac{1}{10}\right)^2 \cdot \frac{1}{10}$$

$$\text{Volume of second layer} = \left(2 \cdot \frac{1}{10}\right)^2 \cdot \frac{1}{10} = \left(\frac{2}{10}\right)^2 \cdot \frac{1}{10}$$

$$\text{Volume of third layer} = \left(3 \cdot \frac{1}{10}\right)^2 \cdot \frac{1}{10} = \left(\frac{3}{10}\right)^2 \cdot \frac{1}{10}$$

$$\vdots \qquad\qquad \vdots$$

$$\text{Volume of 99th layer} = \left(99 \cdot \frac{1}{10}\right)^2 \cdot \frac{1}{10} = \left(\frac{99}{10}\right)^2 \cdot \frac{1}{10}$$

$$\text{Volume of 100th layer} = \left(100 \cdot \frac{1}{10}\right)^2 \cdot \frac{1}{10} = \left(\frac{100}{10}\right)^2 \cdot \frac{1}{10}$$

Thus, the volume of the pyramid is:

$$V = \left(\frac{1}{10}\right)^2 \cdot \frac{1}{10} + \left(\frac{2}{10}\right)^2 \cdot \frac{1}{10} + \left(\frac{3}{10}\right)^2 \cdot \frac{1}{10} + \cdots + \left(\frac{99}{10}\right)^2 \cdot \frac{1}{10} + \left(\frac{100}{10}\right)^2 \cdot \frac{1}{10}$$

The following computer program finds the total volume for the given pyramid with N steps.

```
10  LET V = 0
20  PRINT "HOW MANY STEPS ARE THERE";
30  INPUT N
40  LET H = 10/N
50  FOR X = 1 TO N
60  LET V = V + (X * H) ↑2 * H
70  NEXT X
80  PRINT "VOLUME OF PYRAMID WITH ";N;" STEPS IS ";V
90  END
```

Exercises

1. RUN the given program to verify the volume of the 10-step pyramid and to find the volume of the 100-step pyramid.
2. **a.** Suppose that another pyramid with the same base and height has 1000 steps. RUN the program to find the volume.
   b. Make a chart that shows the volume for the given number of steps: 10, 100, 500, 750, 900, 1000.
   c. As the number of steps increases, what value do the volumes seem to be approaching?
   d. What is the volume of a regular square pyramid with base edge of 10 and height 10?
   e. What can you conclude from comparing the answers to parts (b)–(d)?