

Place Value with Decimals

thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths	hundred-thousandths	millionths
4	5	7	3.	9	1	6	0	7	2

The various places on the place value chart are positioned symmetrically around the ONES place.

From the ones place, we have tens to the left, and tenths to the right. Two places away are hundreds to the left, and hundredths to the right. Three places away are thousands to the left, and thousandths to the right and so on.

In expanded form:

$$4 \cdot 1,000 + 5 \cdot 100 + 7 \cdot 10 + 3 \cdot 1 + 9 \cdot \frac{1}{10} + 1 \cdot \frac{1}{100} + 6 \cdot \frac{1}{1,000} + 7 \cdot \frac{1}{100,000} + 2 \cdot \frac{1}{1,000,000}$$

Using decimals: $4\,000 + 500 + 70 + 3 + 0.9 + 0.01 + 0.006 + 0.00007 + 0.000002$

Example 1.

6 hundred-thousandths is $\frac{6}{100,000}$ or 0.00006.

It has five decimal places, the same as one hundred thousand (100,000) has five zeros.

Example 2.

123 ten-thousandths is $\frac{123}{10,000}$ or 0.0123.

There are four decimal places, the same as ten thousand (10,000) has four zeros.

Example 3. 7 millionths is 0.000007. It has six decimal places, the same as one million has six zeros.

0.000007 *also* happens to have six zeros, if you count the zero in the ones place. However, think of it as having six *decimal places*, instead, because that allows you to easily convert, for example, 453 millionths or 6,795 millionths into decimals: 0.000453 and 0.006795. They do not have six zeros, but they *do* have six decimal places.

Example 4. 465 hundredths is $\frac{465}{100}$.

As a decimal, it needs to have two decimal places because it is so many hundredths. (You can remember that because 100 has two zeros.) So it is 4.65.

Example 5.

2,180,964 ten-thousandths is $\frac{2,180,964}{10,000}$.

As a decimal, it needs to have four decimal places because it is so many ten-thousandths (and 10,000 has four zeros). So it is 218.0964.

1. Draw lines to match the expressions that have the same value.

0.00006

0.0015

0.000006

0.00015

0.006

0.000015

0.015

6 parts per thousand

15 hundred-thousandths

15 ten-thousandths

6 hundred-thousandths

15 parts per million

15 thousandths

6 millionths

$$\frac{6}{100,000}$$

$$\frac{6}{1,000}$$

$$\frac{6}{100,000}$$

$$\frac{15}{100,000}$$

$$\frac{15}{1,000}$$

$$\frac{15}{10,000}$$

$$\frac{15}{1,000,000}$$