Thousandths

A race clock reads 52.374 seconds. What is each digit worth, and how do you say the number out loud?

WORDS TO KNOW

Thousandth: one of 1000 equal parts of a whole. One thousandth is 0.001, or $\frac{1}{1000}$.

Place value chart: a chart that gives each digit its own column, with what one piece of that column is worth.

Expanded form: the number written as the sum of what each digit is worth.

Placeholder zero: a 0 that holds a place open so the other digits stay in their places.

Thousandths place: the third place to the right of the decimal point.

Standard form: the usual digits with a point, such as 52.374.

Word form: the number written in words.

KEY IDEAS

1. Each digit is worth its count times its place

Read 52.374 from left to right: 5 tens, 2 ones, then the point, then 3 tenths, 7 hundredths and 4 thousandths. The point has no digit of its own. It marks where the whole part ends.

A digit is worth the digit times the value of its place. The 4 in 52.374 is worth $4 \times 0.001 = 0.004$, or $\frac{4}{1000}$.

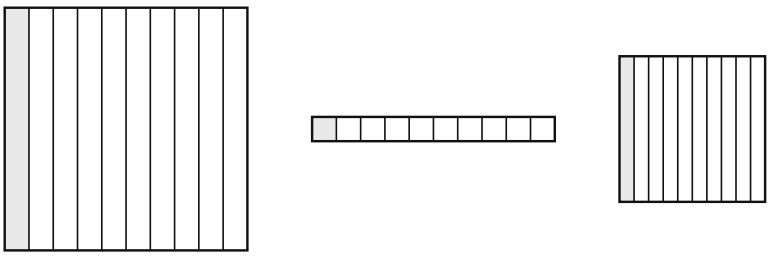
tens 10	ones 1		tenths 0.1	hundredths 0.01	thousandths 0.001
5	2	.	3	7	4

2. Each place is one tenth of the place to its left

Cut a whole into ten equal parts and you get tenths. Cut a tenth into ten and you get hundredths. Cut a hundredth into ten and you get thousandths.

Ten thousandths make one hundredth. Ten hundredths make one tenth. Ten tenths make one whole.

So a digit is worth 10 times the same digit one place to its right, and 100 times the same digit two places to its right. One whole is $10 \times 10 \times 10 = 1000$ thousandths.



1 whole = 10 tenths

1 tenth = 10 hundredths

1 hundredth = 10 thousandths

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3. Three ways to write the same number

Expanded form has one term for each digit. Word form says the whole part, then **and** for the point, then the digits after the point as one number, then the name of the last place.

$$52.374 = 50 + 2 + 0.3 + 0.07 + 0.004$$

Word form: fifty-two and three hundred seventy-four thousandths.

With no whole part there is no "and": 0.374 is three hundred seventy-four thousandths.

WATCH OUT

- **Keep the zeros inside.** A zero between the point and a later digit holds a place. Take it out and the digits after it slide left and are worth ten times as much.
- **A zero at the far right adds nothing.** 0.5, 0.50 and 0.500 are the same number.
- **"And" means the point, and only the point.** "Three hundred and seven thousandths" is 300.007, but "three hundred seven thousandths" is 0.307.

WORKED EXAMPLES

Example 1. A sled run takes 27.418 seconds. Give the value of each digit.

1. Put each digit in its place: 2 tens, 7 ones, 4 tenths, 1 hundredth, 8 thousandths.
2. Multiply each digit by its place value: 2 × 10 = 20, 7 × 1 = 7, 4 × 0.1 = 0.4, 1 × 0.01 = 0.01 and 8 × 0.001 = 0.008.

Answer: 20, 7, 0.4, 0.01 and 0.008. **Check:** 20 + 7 + 0.4 + 0.01 + 0.008 = 27.418.

Example 2. Write 9.063 in expanded form and in word form.

1. The digits are 9 ones, 0 tenths, 6 hundredths and 3 thousandths.
2. The zero tenths add nothing, so leave that term out: 9 + 0.06 + 0.003.
3. With fractions: $9 + \frac{6}{100} + \frac{3}{1000}$.
4. For words: the whole part is nine. The digits after the point, 063, are the number 63, and the last one is in the thousandths place.

Answer: 9 + 0.06 + 0.003; nine and sixty-three thousandths.

Example 3. Write "thirty-one and forty thousandths" in standard form.

1. "And" is the point, so the whole part is 31.
2. Thousandths means three places after the point. Forty is 40, so its last digit goes in the third place: 040.
3. The first 0 holds the tenths place. The last 0 adds nothing, so it may be dropped.

Answer: 31.040, which is the same number as 31.04.

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