

LESSON
7·2

Negative Powers of 10



Our base-ten place-value system works for decimals as well as for whole numbers.

Tens	Ones	.	Tenths	Hundredths	Thousandths
10s	1s	.	0.1s	0.01s	0.001s

Negative powers of 10 can be used to name decimal places.

Example: $10^{-2} = \frac{1}{10^2} = \frac{1}{10 * 10} = \frac{1}{10} * \frac{1}{10} = 0.1 * 0.1 = 0.01$

Very small decimals can be hard to read in standard notation, so people often use number-and-word notation, exponential notation, or prefixes instead.

Guides for Small Numbers			
Number-and-Word Notation	Exponential Notation	Standard Notation	Prefix
1 tenth	$10^{-1} = \frac{1}{10}$	0.1	deci-
1 hundredth	$10^{-2} = \frac{1}{10 * 10}$	0.01	centi-
1 thousandth	$10^{-3} = \frac{1}{10 * 10 * 10}$	0.001	milli-
1 millionth	$10^{-6} = \frac{1}{10 * 10 * 10 * 10 * 10 * 10}$	0.000001	micro-
1 billionth	$10^{-9} = \frac{1}{10 * 10 * 10 * 10 * 10 * 10 * 10 * 10 * 10}$	0.000000001	nano-
1 trillionth	$10^{-12} = \frac{1}{10 * 10 * 10 * 10 * 10 * 10 * 10 * 10 * 10 * 10 * 10 * 10}$	0.000000000001	pico-

Use the table above to complete the following statements.

- A fly can beat its wings once every 10^{-3} seconds, or once every one thousandth of a second. This is one _____ second.
- Earth travels around the sun at a speed of about one inch per microsecond. This is 10^{\square} second, or a _____ of a second.
- Electricity can travel one foot in a nanosecond, or one _____ of a second. This is 10^{\square} second.
- In 10^{\square} second, or one picosecond, an air molecule can spin once. This is one _____ of a second.