

Powers of Ten

You can use a pattern to mentally find the product of any number and a power of 10. Count the number of zeros in the power of 10 or use the exponent. Then move the decimal point that number of places *to the right*.

Decimal	Power of 10	Product
19.7×10^1 (or 10)		= 197
19.7×10^2 (or 100)		= 1,970
19.7×10^3 (or 1,000)		= 19,700
19.7×10^4 (or 10,000)		= 197,000

EXAMPLES

Use Mental Math to Multiply

Multiply mentally.



$$12.562 \times 100$$

$$12.562 \times 100 = 12.562$$
$$= 1,256.2$$

Move the decimal point two places to the right, since 100 has two zeros.



$$0.59 \times 10^4$$

$$0.59 \times 10^4 = 0.5900$$
$$= 5,900$$

Move the decimal point four places to the right, since the exponent is 4.

To mentally multiply by a power of ten that is less than 1, count the number of decimal places. Or, if the power is written as a fraction, use the exponent in the denominator. Then move the decimal point that number of places *to the left*.

Decimal	Power of 10	Product
19.7×0.1 (or $\frac{1}{10^1}$)		= 1.97
19.7×0.01 (or $\frac{1}{10^2}$)		= 0.197
19.7×0.001 (or $\frac{1}{10^3}$)		= 0.0197

EXAMPLES

Use Mental Math to Multiply

Multiply mentally.



$$10.5 \times 0.01$$

$$10.5 \times 0.01 = 10.5$$
$$= 0.105$$

Move the decimal point two places to the left.



$$5,284 \times 0.00001$$

$$5,284 \times 0.00001 = 5284$$
$$= 0.05284$$

Move the decimal point five places to the left.