



7th Grade Lesson 47

- I can use powers of 10 to show place value.
- I can write numbers in expanded notation using powers of 10.
- I can multiply and divide by powers of 10.

Positive Powers of 10

$$10^0 = 1$$

$$10^1 = 10$$

$$10^2 = 10 \cdot 10 = 100$$

$$10^3 = 1000$$

$$10^4 = 10,000$$

Multiplying Powers of 10:

$$1000 \times 1000 = 1,000,000$$

$$10^3 \times 10^3 = 10^6 \quad 10^2 \cdot 10^4 = 10^6$$

$$10^2 \cdot 10^3 \cdot 10^4 = 10^9$$

add the exponents

Dividing Powers of 10:

$$1,000,000 \div 1000 = 1000$$

$$10^6 \div 10^3 = 10^3$$

subtract the exponents

$$\frac{10^8}{10^5} = \frac{\boxed{1000} = 10^3}{100000}$$

Powers of 10 can be used to show place value

hundred trillions	ten trillions	trillions	hundred billions	ten billions	billions	hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	units
10^{14}	10^{13}	10^{12}	10^{11}	10^{10}	10^9	10^8	10^7	10^6	10^5	10^4	10^3	10^2	10^1	10^0

Powers of 10 can be used to write numbers in expanded notation

Write 5206 in expanded notation using powers of 10.

$$5000 + 200 + 6$$

$$(5 \cdot 1000) + (2 \cdot 100) + (6 \cdot 1)$$

$$(5 \cdot 10^3) + (2 \cdot 10^2) + (6 \cdot 10^0) \neq$$

Write 1760 in expanded notation using powers of 10.

$$(1 \cdot 10^3) + (7 \cdot 10^2) + (6 \cdot 10^1)$$

Multiplying by powers of 10

$$46.235 \times 10^2$$

$$\begin{array}{r} 46.235 \\ \times 100 \\ \hline 4623.500 \end{array}$$

To multiply a decimal number by a positive power of 10, shift the decimal point to the right the number of places indicated by the exponent.

Multiply: 3.14×10^4

31,400

Write $2\frac{1}{2}$ billion in standard form.

$2.5 \cdot 10^9$

2,500,000,000

Dividing by powers of 10

$$4.75 \div 10^3$$

.00475

To divide a number by a positive power of 10, we shift the decimal point to the left the number of places indicated by the exponent.

$$3.5 \div 10^4$$

0.00035



Assignment

Problem Set 47

*A/B Optional: #5, 7, 10, 12, 23, 28