

1.4 Applying Exponents

p. 18

9-13-17

The distance from Venus to the Sun is over 100,000,000 kilometers. You can write this number as a power of ten by using a base of ten and an exponent.

$$10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 10^8$$

Power of ten \longleftarrow ↑

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The table shows several powers of ten.

Power of 10	Meaning	Value
10^1	10	10
10^2	$10 \cdot 10$	100
10^3	$10 \cdot 10 \cdot 10$	1,000
10^4	$10 \cdot 10 \cdot 10 \cdot 10$	10,000

$10^1 = 10$
 $10^2 = 100$

Multiply $14 \cdot 10^3$.

$14 \cdot 10^3$
 14,000 (1000)
 $\begin{array}{r} 1,000 \\ \times 14 \\ \hline 14,000 \end{array}$

Multiply $12 \cdot 10^2$.

$12 \cdot 10^2 = 1,200$
 (100)

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Scientific notation is a kind of shorthand that can be used to write large numbers. Numbers expressed in scientific notation are written as the product of *two factors*. In scientific notation, 17,900,000 is written as

1.79 x 10⁷

A number greater than or equal to 1 but less than 10

A power of 10

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Rules

1. must put a decimal after the first digit
2. times symbol
3. 10 with an exponent

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Write the number 4,340,000 in scientific notation.

4.34 x 10⁶

Write the number 8,421,000 in scientific notation.

8.421 x 10⁶

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The population of China in the year 2000 was estimated to be about 1.262 x 10⁹. Write this number in standard form.

1.262 x 10⁹
1,262,000,000

The distance from the Earth to the Sun is calculated to be 1.5 x 10⁸ kilometers. Write this distance in standard form.

1.5 x 10⁸
150,000,000

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In 2005, the population of Mexico was 1.06×10^8 and the population of Brazil was 1.86×10^8 . In which country do more people live?

To compare numbers written in scientific notation, first compare the exponents. If the exponents are equal, then compare the decimal portion of the numbers.

1.06

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The number of coins in Ty's jar was 0.76×10^4 and number of coins in Laurel's jar was 0.93×10^3 . In which jar are there more coins?

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Multiply.

1. 25×10^2

2. 18×10^4

3. 110×10^2

4. 3.742×10^3

3.742×10^3
3,742

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Write each number in scientific notation.

5. 7,400,000 = 7.4×10^6

6. 45,000

7. Earth is about 9.292×10^7 miles from the Sun.
Write this number in standard form.

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