good 7.2×10^3

Not good 15.234×10^6 → 0.0326×10^3

Section 8.4 Scientific Notation

Assignment:

$c \times 10^n$

*** A number is in **scientific notation** if it is in the form $c \times 10^n$, where $1 < c < 10$ and n is an integer.

$n < 0$ move dec. place Left

$n > 0$ move dec place right

Examples

1. Rewrite in decimal form

a. 3.128×10^3 → 3128

b. 6.4×10^4 → 64,000

c. 3.9×10^{-1} → .39

d. 6.12×10^{-5} → .0000612

2. Rewrite in scientific notation.

$c \times 10^n$

$1 < c < 10$

$c < 1$ neg exp.

$c > 1$ pos exp

a. 52,314 → 5.2314×10^4

b. 3.2 → 3.2×10^0

c. 0.0000428 → 4.28×10^{-5}

d. 602,000,000 → 6.02×10^8

3. Evaluate each expression. Write the result in scientific notation.

a. $(2.5 \times 10^4)(5.8 \times 10^2)$ → $(2.5 \cdot 5.8) \times (10^4 \cdot 10^2)$

→ 14.5×10^6

→ 1.45×10^7

b. $(1.82 \times 10^{-1}) \div (1.4 \times 10^{-3})$ → $\frac{1.82 \times 10^{-1}}{1.4 \times 10^{-3}}$ → 1.3×10^2

c. $(1.5 \times 10^{-4})^3$ → $1.5^3 \times (10^{-4})^3$

3.375×10^{-12}

4. Use a calculator to multiply 0.00000052 by 3,500,000,000.

1820 1.82×10^3

5. a. Light travels at a speed of 1.863×10^5 miles per second. How far does it travel in a year?

$1.863 \times 10^5 \frac{mi}{sec} \cdot \frac{60 sec}{1 min} \cdot \frac{60 min}{1 hr} \cdot \frac{24 hr}{1 day} \cdot \frac{365 d}{1 yr}$

$(1.863 \times 10^5)(31536000) \approx 5.875168 \times 10^{12} \frac{mi.}{year}$

$31536000 = 3.1536 \times 10^7$

b. In 1998, the population of the world was about 5.9 billion. In the same year, the population of the U.S. was 2.7×10^8. What percent of the world population was the U.S. population?

5.9×10^9 world

$\left(\frac{2.7 \times 10^8}{5.9 \times 10^9}\right)$ us / world

4.57627×10^{-1}

$\approx .0457627$

$\approx 4.6\%$