Knoblock/Zuhn

Objective 48-49

Multiply or divide numbers written in scientific notation

PROBLEM

Express the answer in scientific notation.

$(6\times10^{-3})(5\times10^{8})=$

STEP 1

Rewrite the expression so that the integers and the powers of ten are grouped together.

$$(6\times10^{-3})(5\times10^{8})=(6\times5)\times(10^{-3}\times10^{8})$$

STEP 2

Find the product of the integers.

$$(6\times5)\times(10^{-3}\times10^{8})=30\times(10^{-3}\times10^{8})$$

STEP 3

Multiply the powers. Recall that when multiplying powers with the same base, the exponents are added.

$$\begin{aligned}30\times(10^{-3}\times10^{8})&=30\times(10^{-3+8})\\&=30\times10^{5}\end{aligned}$$

STEP 4

Write the product in scientific notation and simplify.

$$\begin{aligned}30\times10^{5}&=(3.0\times10^{1})\times10^{5}\\&=3.0\times(10^{1}\times10^{5})\\&=3.0+10^{1+5}\\&=3\times10^{6}\end{aligned}$$

ANSWER

3×10^{6}

Guided Practice: solve and express your answer in scientific notation.

$(2.2\times10^{7})(1.1\times10^{2})=$

$(3.6\times10^{6})\div(6\times10^{3})=$

$(3.2\times10^{4})(4\times10^{5})=$

PROBLEM

Express the answer in scientific notation.

$(4.2\times10^{8})\div0.3=$

STEP 1

Rewrite 0.3 in scientific notation.

$$0.3=3\times10^{-1}$$

STEP 2

Rewrite the expression with both numbers written in scientific notation.

$$(4.2\times10^{8})\div3=(4.2\times10^{8})\div(3\times10^{-1})$$

STEP 3

Rewrite the expression as a fraction.

$$(4.2\times10^{8})\div(3\times10^{-1})=\frac{4.2\times10^{8}}{3\times10^{-1}}$$

STEP 4

Rewrite the expression using two fractions.

$$\frac{4.2\times10^{8}}{3\times10^{-1}}=\frac{4.2}{3}\times\frac{10^{8}}{10^{-1}}$$

STEP 5

Divide to find the quotient of 4.2 and 3.

$$\frac{4.2}{3}\times\frac{10^{8}}{10^{-1}}=1.4\times\frac{10^{8}}{10^{-1}}$$

STEP 6

Apply the quotient of powers property. Subtract the exponents of the powers of 10 and simplify.

$$\begin{aligned}1.4\times\frac{10^{8}}{10^{-1}}&=1.4\times10^{8-(-1)}\\&=1.4\times10^{8+1}\\&=1.4\times10^{9}\end{aligned}$$

ANSWER

1.4×10^{9}

8th Grade Math
Objective 46-47

Knoblock/Zuhn

Practice: Multiply or divide the following quantities. Express your answer in scientific notation. *Show your work.*

1. $(5 \times 10^4)(6 \times 10^7) =$
2. $\frac{5.6 \times 10^{18}}{7 \times 10^6} =$
3. $(6 \times 10^{-5})(5 \times 10^{11}) =$
4. $\frac{6.3 \times 10^4}{7 \times 10^{11}} =$
5. $(1.7 \times 10^7) \times 40 =$
6. $(9.5 \times 10^9) \div 50$
7. $(3.3 \times 10^8) \times 0.3 =$
8. $(4.2 \times 10^7) \div 0.003 =$

Additional Help:
https://www.youtube.com/watch?v=ciFOlirz4Js
https://www.youtube.com/watch?v=UADVIDjdaVg