

Objective 46-47

Add or subtract numbers written in scientific notation

PROBLEM

$$(8 \times 10^8) + (2 \times 10^8) =$$

STEP 1

Simplify the equation using the distributive property.

$$\begin{aligned}(8 \times 10^8) + (2 \times 10^8) &= (8 + 2) \times 10^8 \\ &= 10 \times 10^8\end{aligned}$$

STEP 2

Simplify 10×10^8 . Use the product of powers rule to simplify.

$$10 \times 10^8 = 10^1 \times 10^8 = 10^{1+8} = 10^9$$

STEP 3

Write the result in scientific notation.

A number in scientific notation has the form $a \times 10^n$, where $1 \leq a < 10$ and n is an integer. The number 10^9 is not yet written in scientific notation because it does not have this form. In this case, the number a multiplied by 10^9 should equal 10^9 . Therefore, a must be 1.

$$10^9 = 1 \times 10^9$$

ANSWER

$$1 \times 10^9$$

Guided Practice: add or subtract and express your answer in scientific notation.

$$2.3 \times 10^7 + 6.2 \times 10^7 =$$

$$3.6 \times 10^3 + 7.6 \times 10^3 =$$

$$5.9 \times 10^4 + 3.2 \times 10^5 =$$

PROBLEM

Express the answer in scientific notation.

$$(1 \times 10^{-4}) + 0.005 =$$

STEP 1

Write 0.005 in scientific notation.

$$0.005 = (5 \times 10^{-3})$$

STEP 2

Rewrite the smaller number, (1×10^{-4}) , with the same power of 10 as 5×10^{-3} .

$$(1 \times 10^{-4}) = (0.1 \times 10^{-3})$$

STEP 3

Rewrite the expression with the converted numbers.

$$(1 \times 10^{-4}) + 0.005 = (0.1 \times 10^{-3}) + (5 \times 10^{-3})$$

STEP 4

Factor out 10^{-3} using the distributive property.

$$(0.1 \times 10^{-3}) + (5 \times 10^{-3}) = (0.1 + 5) \times 10^{-3}$$

STEP 5

Add the decimal numbers.

$$(0.1 + 5) \times 10^{-3} = 5.1 \times 10^{-3}$$

ANSWER

$$5.1 \times 10^{-3}$$

PROBLEM

$$(8.2 \times 10^4) - (3 \times 10^3) =$$

STEP 1

Rewrite 8.2×10^4 as a number times 10^3 .

$$\begin{aligned} 8.2 \times 10^4 &= 8.2 \times 10 \times 10^3 \\ &= 82 \times 10^3 \end{aligned}$$

STEP 2

Rewrite the given expression.

$$(8.2 \times 10^4) - (3 \times 10^3) = (82 \times 10^3) - (3 \times 10^3)$$

STEP 3

Use the distributive property of multiplication over subtraction. Factor out the common factor 10^3 and simplify.

$$\begin{aligned} (82 \times 10^3) - (3 \times 10^3) &= (82 - 3) \times 10^3 \\ &= 79 \times 10^3 \end{aligned}$$

STEP 4

Recall the form of a number in scientific notation.

A number in scientific notation has the form $a \times 10^b$.
The exponent b is an integer and the coefficient a is a real number $1 \leq a < 10$.

STEP 5

Write 79×10^3 in scientific notation.

$$\begin{aligned} 79 \times 10^3 &= 7.9 \times 10 \times 10^3 \\ &= 7.9 \times 10^4 \end{aligned}$$

ANSWER

$$7.9 \times 10^4$$

Guided Practice: add or subtract and express your answer in scientific notation.

$$6.3 \times 10^7 - 6.2 \times 10^7 =$$

$$9.1 \times 10^3 - 7.6 \times 10^2 =$$

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

1. $100,000,000 + 3.2 \times 10^8 =$

2. $0.002 - 3 \times 10^{-4} =$

3. $50,000,000 - 3.65 \times 10^7 =$

4. $4.7 \times 10^5 + 2 \times 10^5 =$

5. $1.3 \times 10^6 + 7.6 \times 10^5 =$

6. $6 \times 10^{-9} - 4 \times 10^{-9} =$

Additional Help:

www.youtube.com/watch?v=PYP75sryWA

www.youtube.com/watch?v=p0zVNTko7z4