GRADE 7 ACCELERATED · UNIT 4 · LESSON 1

Adding and Subtracting in Scientific Notation

MA.8.NSO.1.5

I can add and subtract two numbers written in scientific notation, and write the answer in scientific notation.

Warm-Up

1. Write 0.00062 in scientific notation.
2. How many times larger is 8×10^7 than 2×10^4 ?
3. Find the value: $\sqrt{144}$
4. Find the sum: $0.49 + 1.2$

Warm-Up

1. Write 0.00062 in scientific notation. **6.2×10^{-4}**
2. How many times larger is 8×10^7 than 2×10^4 ? **4,000**
3. Find the value: $\sqrt{144}$ **12**
4. Find the sum: $0.49 + 1.2$ **1.69**

Vocabulary

scientific notation

a number written as $a \times 10^n$,

where a is at least 1 and less than 10 and n is an integer

coefficient

the factor a in $a \times 10^n$. In a finished answer it always satisfies $1 \le a < 10$

common power of ten

the matching power that two numbers are written over before they are added or subtracted — the place value they share

Notes

I. A power of ten is a place value

10^3	10^4	10^5	10^6
thousands	ten thousands	hundred thousands	millions

$$49{,}500 + 121{,}000 = 170{,}500$$

$$4.95 \times 10^4 + 12.1 \times 10^4 = 17.05 \times 10^4 = 1.705 \times 10^5$$

Two numbers can be added only when they carry the same power of ten.

Notes

II. Same power: add or subtract the coefficients

$$(5.2 \times 10^{6}) + (3.1 \times 10^{6}) = 8.3 \times 10^{6}$$

$$(7 \times 10^{-8}) + (6 \times 10^{-8}) = 13 \times 10^{-8} = 1.3 \times 10^{-7}$$

Add or subtract the coefficients. The power of ten does not change.

Then check the coefficient: if it is not between 1 and 10, the answer is not finished.

Notes

III. Different powers: rewrite one of them first

$$(9.4 \times 10^5) - (8.2 \times 10^3)$$

$$= (9.4 \times 10^5) - (0.082 \times 10^5) = 9.318 \times 10^5$$

$$(1.3 \times 10^3) + (3.4 \times 10^5) = 3.413 \times 10^5, \quad \text{never} \quad 4.7 \times 10^8$$

Rewrite one number so both carry the same power of ten, then add or subtract the coefficients.

Exponent up one, decimal point one place left. The value does not move.

Example 1

$$(8.6 \times 10^7) + (5.9 \times 10^7)$$

Add. Write the answer in scientific notation.

Example 1

$$(8.6 \times 10^{7}) + (5.9 \times 10^{7}) = 14.5 \times 10^{7}$$

$$14.5 \times 10^{7} = 1.45 \times 10^{8}$$

$$145{,}000{,}000$$

Answer: 1.45×10^{8}

Your Turn

$$(4.8 \times 10^{-3}) + (7.5 \times 10^{-3})$$

Add. Write the answer in scientific notation.

Your Turn

$$(4.8 \times 10^{-3}) + (7.5 \times 10^{-3})$$

Add. Write the answer in scientific notation.

Same power, so add the fronts: $4.8 + 7.5 = 12.3$

$12.3 \times 10^{-3} = 1.23 \times 10^{-2}$

Answer: 1.23×10^{-2}

Example 2

$$(7.3 \times 10^6) - (4.5 \times 10^5)$$

Subtract. Write the answer in scientific notation.

Example 2

$$4.5 \times 10^5 = 0.45 \times 10^6$$

$$(7.3 \times 10^6) - (0.45 \times 10^6) = 6.85 \times 10^6$$

$$7{,}300{,}000 - 450{,}000 = 6{,}850{,}000$$

Answer: 6.85×10^6

Your Turn

$$(5.6 \times 10^{-4}) - (9.0 \times 10^{-6})$$

Subtract. Write the answer in scientific notation.

Your Turn

$$(5.6 \times 10^{-4}) - (9.0 \times 10^{-6})$$

Subtract. Write the answer in scientific notation.

Match the powers: $9.0 \times 10^{-6} = 0.09 \times 10^{-4}$

$5.6 - 0.09 = 5.51$

5.51×10^{-4}

Answer: 5.51×10^{-4}

Whiteboards · Question 1 of 9

$$(3.2 \times 10^5) + (4.1 \times 10^5)$$

Answer it.

Whiteboards · Question 1 of 9

$$(3.2 \times 10^5) + (4.1 \times 10^5)$$

Same power, so add the fronts: $3.2 + 4.1 = 7.3$

7.3×10^5

Answer: 7.3×10^5

Whiteboards · Question 2 of 9

A stadium sold 4.2×10^4 tickets on Friday

and 3.5×10^4 on Saturday. Each ticket cost 38 dollars.

How many tickets were sold on the two days?

Answer it.

Whiteboards · Question 2 of 9

A stadium sold 4.2×10^4 tickets on Friday

and 3.5×10^4 on Saturday. Each ticket cost 38 dollars.

How many tickets were sold on the two days?

Same power, so add the fronts: $4.2 + 3.5 = 7.7$

7.7×10^4

Answer: 7.7×10^4

Whiteboards · Question 3 of 9

$$(8 \times 10^{-6}) + (3 \times 10^{-6})$$

Answer it.

Whiteboards · Question 3 of 9

$$(8 \times 10^{-6}) + (3 \times 10^{-6})$$

$$8 + 3 = 11$$

$$11 \times 10^{-6} = 1.1 \times 10^{-5}$$

Answer: 1.1×10^{-5}

Whiteboards · Question 4 of 9

$$(5.6 \times 10^8) - (4.9 \times 10^8)$$

Answer it.

Whiteboards · Question 4 of 9

$$(5.6 \times 10^{8}) - (4.9 \times 10^{8})$$

$$5.6 - 4.9 = 0.7$$

$$0.7 \times 10^{8} = 7 \times 10^{7}$$

Answer: 7×10^{7}

Whiteboards · Question 5 of 9

$$(1.6 \times 10^4) + (2.3 \times 10^6)$$

Which is the sum?

A. 3.9×10^6

B. 3.9×10^{10}

C. 2.316×10^6

D. 2.46×10^6

Answer it.

Whiteboards · Question 5 of 9

$$(1.6 \times 10^4) + (2.3 \times 10^6)$$

Which is the sum?

Match the powers: $1.6 \times 10^4 = 0.016 \times 10^6$

$0.016 + 2.3 = 2.316$

2.316×10^6

Answer: C — 2.316×10^6

Whiteboards · Question 6 of 9

$$(2.5 \times 10^6) + (9.8 \times 10^6)$$

Which is the sum, written in scientific notation?

A. 12.3×10^6

B. 12.3×10^{12}

C. 1.23×10^6

D. 1.23×10^7

Answer it.

Whiteboards · Question 6 of 9

$$(2.5 \times 10^6) + (9.8 \times 10^6)$$

Which is the sum, written in scientific notation?

$$2.5 + 9.8 = 12.3$$

$$12.3 \times 10^6 = 1.23 \times 10^7$$

Answer: D — 1.23×10^7

Whiteboards · Question 7 of 9

$$(7.8 \times 10^{-2}) - (6.4 \times 10^{-3})$$

Answer it.

Whiteboards · Question 7 of 9

$$(7.8 \times 10^{-2}) - (6.4 \times 10^{-3})$$

Match the powers: $6.4 \times 10^{-3} = 0.64 \times 10^{-2}$

$7.8 - 0.64 = 7.16$

7.16×10^{-2}

Answer: 7.16×10^{-2}

Whiteboards · Question 8 of 9

$$(4.5 \times 10^6) + (n \times 10^6) = 1.02 \times 10^7$$

What is the value of n ?

Answer it.

Whiteboards · Question 8 of 9

$$(4.5 \times 10^6) + (n \times 10^6) = 1.02 \times 10^7$$

What is the value of n ?

$1.02 \times 10^7 = 10.2 \times 10^6$

$4.5 + n = 10.2$

$n = 10.2 - 4.5 = 5.7$

Answer: $n = 5.7$

Whiteboards · Question 9 of 9

Devon writes $(1.9 \times 10^2) + (6.6 \times 10^4) = 8.5 \times 10^6$.

Name the two mistakes he made, and give the correct sum.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Devon writes $(1.9 \times 10^2) + (6.6 \times 10^4) = 8.5 \times 10^6$.

Name the two mistakes he made, and give the correct sum.

The powers do not match, and exponents are not added.

$1.9 \times 10^2 = 0.019 \times 10^4$

$0.019 + 6.6 = 6.619$, so 6.619×10^4

Answer: 6.619×10^4

Independent Set

1. $(4.1 \times 10^{6}) + (2.7 \times 10^{6})$
2. $(9.3 \times 10^{-5}) - (5.1 \times 10^{-5})$
3. $(7.5 \times 10^{3}) + (8.9 \times 10^{3})$
4. $(6.2 \times 10^{7}) + (3.5 \times 10^{6})$
5. $(4.8 \times 10^{-2}) - (9.0 \times 10^{-4})$
6. Find n. $(5.2 \times 10^{9}) + (n \times 10^{9}) = 1.31 \times 10^{10}$

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 67. Due by the Unit 4 test.

Today's skills — all required

Add and subtract numbers written in scientific notation — HUR