LESSON MAKER PRO

Power of Ten

Calculate with very large and very small numbers.

GRADE 8 · 8.NR.2.4

8.NR.2.4 "Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology (e.g...."

NAME _____ DATE _____

MATCH THE POWERS

To add or subtract, first rewrite both numbers with the same power of 10, then combine the coefficients. To multiply, multiply the coefficients and add the exponents. To divide, divide the coefficients and subtract the exponents; on a calculator, 4.2E-5 means 4.2×10^{-5}.

WORKED EXAMPLE

Find: $9.3 \times 10^{14} + 5.5 \times 10^{14}$

1. The powers of 10 already match.
2. Add the coefficients: 9.3 + 5.5 = 14.8.
3. Rewrite in scientific notation: $14.8 \times 10^{14} = 1.48 \times 10^{15}$.

Answer: 1.48×10^{15}

PRACTICE 6 problems

1 $3.6 \times 10^{5} + 4.1 \times 10^{5}$

ANSWER _____

2 $8.9 \times 10^{-4} - 2.3 \times 10^{-4}$

ANSWER _____

3 $(2.5 \times 10^{3})(4 \times 10^{-2})$

ANSWER _____

4 $(7.2 \times 10^{8}) / (3 \times 10^{4})$

ANSWER _____

5 $0.003 + 6.5 \times 10^{-4}$

ANSWER _____

6 A calculator displays 4.07E-6. Write this number in decimal notation.

ANSWER _____

APPLY IT Show your work

1 An esports club downloads 1.8×10^9 bytes for a game update and 6.5×10^8 bytes for a tournament patch. How many bytes do the files use altogether?

WORK SPACE

ANSWER _____

2 A student media project uses 9.6×10^7 bytes of storage for 3.2×10^3 equal-length video clips. How many bytes of storage does each clip use?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find $(4.5 \times 10^6 - 8 \times 10^5) / (2 \times 10^{-2})$. Write your answer in scientific notation.

WORK SPACE AND ANSWER

Power of Ten

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	$3.6 \times 10^5 + 4.1 \times 10^5$	**7.7×10^5**
2	$8.9 \times 10^{-4} - 2.3 \times 10^{-4}$	**6.6×10^{-4}**
3	$(2.5 \times 10^3)(4 \times 10^{-2})$	**1×10^2**
4	$(7.2 \times 10^8) / (3 \times 10^4)$	**2.4×10^4**
5	$0.003 + 6.5 \times 10^{-4}$	**3.65×10^{-3}**
6	A calculator displays 4.07E-6. Write this number in decimal notation.	**0.00000407**

PART 2 · APPLY IT

1. **2.45×10^9 bytes** Rewrite 1.8×10^9 as 18×10^8. Then add: $18 \times 10^8 + 6.5 \times 10^8 = 24.5 \times 10^8 = 2.45 \times 10^9$ bytes.
2. **3×10^4 bytes** Divide the coefficients, 9.6 / 3.2 = 3, and subtract the exponents, 7 - 3 = 4. Each clip uses 3×10^4 bytes.

CHALLENGE

1.85×10^8

Accept equivalent decimal forms when they are exact, such as 0.00365 for 3.65×10^{-3}. Scientific notation answers should have a coefficient that is at least 1 and less than 10.