Operations with Scientific Notation

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

In scientific notation a number is $a \times 10^n$ with $1 \leq a < 10$. To *multiply*, multiply the front numbers and *add* the exponents. To *divide*, divide the fronts and *subtract* the exponents.

▷ **Example:** Multiply $(2 \times 10^3)(3 \times 10^2)$. **Work:** Multiply the fronts: $2 \times 3 = 6$. Add the exponents: $3 + 2 = 5$. ★ **Answer:** 6×10^5

$$(a \times 10^m)(b \times 10^n) = ab \times 10^{m+n}$$

Multiply fronts, add exponents.

Practice Problems

Simplify (give the answer in scientific notation).

1. $(2 \times 10^3)(3 \times 10^2)$ _____
2. $(4 \times 10^2)(2 \times 10^3)$ _____
3. $\dfrac{6 \times 10^5}{2 \times 10^2}$ _____
4. $(2 \times 10^4)(4 \times 10^1)$ _____
5. $\dfrac{9 \times 10^6}{3 \times 10^2}$ _____
6. $(5 \times 10^2)(1 \times 10^3)$ _____
7. $\dfrac{8 \times 10^4}{4 \times 10^2}$ _____
8. $(3 \times 10^2)(3 \times 10^2)$ _____
9. $(1 \times 10^3)(7 \times 10^2)$ _____
10. $\dfrac{6 \times 10^8}{2 \times 10^3}$ _____
11. $(2 \times 10^2)(2 \times 10^2)$ _____
12. $(4 \times 10^3)(2 \times 10^2)$ _____
13. $\dfrac{9 \times 10^4}{3 \times 10^1}$ _____
14. Write 5×10^3 in standard form _____

Word Problems

15. Multiply $(3 \times 10^4)(2 \times 10^2)$. _____
16. Divide (8×10^6) by (2×10^2). _____
17. Multiply $(2 \times 10^3)(4 \times 10^3)$. _____
18. A warehouse record lists 6×10^5 sheets of paper for the year. Write that quantity as a standard number. _____

Answer Keys

1. 6×10^5	**7.** 2×10^2	**13.** 3×10^3
2. 8×10^5	**8.** 9×10^4	**14.** 5000
3. 3×10^3	**9.** 7×10^5	**15.** 6×10^6
4. 8×10^5	**10.** 3×10^5	**16.** 4×10^4
5. 3×10^4	**11.** 4×10^4	**17.** 8×10^6
6. 5×10^5	**12.** 8×10^5	**18.** 600000

Step-by-Step Explanations

1. Start by naming the process: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $2 \times 3 = 6$, $3 + 2 = 5$: 6×10^5. So the final answer is 6×10^5.
2. A good way to think about this is: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $4 \times 2 = 8$, $2 + 3 = 5$: 8×10^5. So the final answer is 8×10^5.
3. Step by step: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $6 \div 2 = 3$, $5 - 2 = 3$: 3×10^3. So the final answer is 3×10^3.
4. Take it one move at a time: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $2 \times 4 = 8$, $4 + 1 = 5$: 8×10^5. So the final answer is 8×10^5.
5. Start by naming the process: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $9 \div 3 = 3$, $6 - 2 = 4$: 3×10^4. So the final answer is 3×10^4.
6. A good way to think about this is: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $5 \times 1 = 5$, $2 + 3 = 5$: 5×10^5. So the final answer is 5×10^5.
7. Step by step: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $8 \div 4 = 2$, $4 - 2 = 2$: 2×10^2. So the final answer is 2×10^2.
8. Take it one move at a time: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $3 \times 3 = 9$, $2 + 2 = 4$: 9×10^4. So the final answer is 9×10^4.
9. Start by naming the process: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $1 \times 7 = 7$, $3 + 2 = 5$: 7×10^5. So the final answer is 7×10^5.
10. A good way to think about this is: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $6 \div 2 = 3$, $8 - 3 = 5$: 3×10^5. So the final answer is 3×10^5.
11. Step by step: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $2 \times 2 = 4$, $2 + 2 = 4$: 4×10^4. So the final answer is 4×10^4.
12. Take it one move at a time: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $4 \times 2 = 8$, $3 + 2 = 5$: 8×10^5. So the final answer is 8×10^5.
13. Start by naming the process: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $9 \div 3 = 3$, $4 - 1 = 3$: 3×10^3. So the final answer is 3×10^3.
14. A good way to think about this is: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is Move the point 3 right: 5000. So the final answer is 5000.
15. Step by step: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $3 \times 2 = 6$, $4 + 2 = 6$: 6×10^6. So the final answer is 6×10^6.
16. Take it one move at a time: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $8 \div 2 = 4$, $6 - 2 = 4$: 4×10^4. So the final answer is 4×10^4.
17. Start by naming the process: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is $2 \times 4 = 8$, $3 + 3 = 6$: 8×10^6. So the final answer is 8×10^6.
18. A good way to think about this is: Handle the front numbers and the powers of ten separately, then rewrite the result in scientific notation if needed. The setup/work is Move the point 5 right: 600000. So the final answer is 600000.

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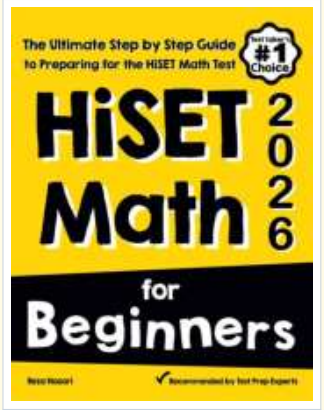

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