

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. $(2 \times 10^3)(3 \times 10^2)$ | _____ | 8. $(3 \times 10^2)(3 \times 10^2)$ | _____ |
| 2. $(4 \times 10^2)(2 \times 10^3)$ | _____ | 9. $(1 \times 10^3)(7 \times 10^2)$ | _____ |
| 3. $\frac{6 \times 10^5}{2 \times 10^2}$ | _____ | 10. $\frac{6 \times 10^8}{2 \times 10^3}$ | _____ |
| 4. $(2 \times 10^4)(4 \times 10^1)$ | _____ | 11. $(2 \times 10^2)(2 \times 10^2)$ | _____ |
| 5. $\frac{9 \times 10^6}{3 \times 10^2}$ | _____ | 12. $(4 \times 10^3)(2 \times 10^2)$ | _____ |
| 6. $(5 \times 10^2)(1 \times 10^3)$ | _____ | 13. $\frac{9 \times 10^4}{3 \times 10^1}$ | _____ |
| 7. $\frac{8 \times 10^4}{4 \times 10^2}$ | _____ | 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

2. 8×10^5

3. 3×10^3

4. 8×10^5

5. 3×10^4

6. 5×10^5

7. 2×10^2

8. 9×10^4

9. 7×10^5

10. 3×10^5

11. 4×10^4

12. 8×10^5

13. 3×10^3

14. 5000

15. 6×10^6

16. 4×10^4

17. 8×10^6

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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