

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 | 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 |

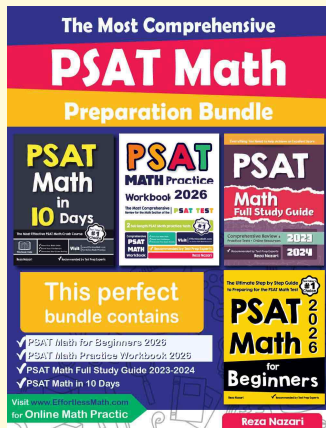
Step-by-Step Explanations

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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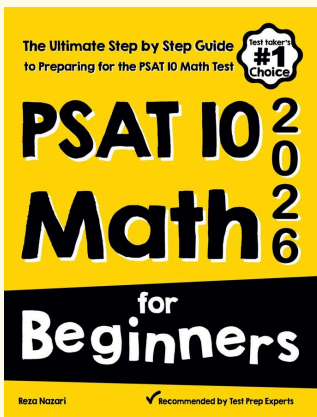
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