MATH Worksheets GO!

I. Model Problems.
II. Practice Problems
III. Challenge questions
IV. Answer Key

Web Resources

Scientific Notation and Standard Notation:
www.mathwarehouse.com/scientific_notation

<div align="center">**Operations with Scientific Notation**</div>

Very large and very small numbers are often written in scientific notation. This makes them easier to use in calculations and comparisons.

I. Model Problems

Multiplying numbers written in Scientific Notation is a three step process.

1. Group the coefficients and exponents together

$$(1.5 \times 10^3) \times (7.3 \times 10^2) = (1.5 \times 7.3) \times (10^3 \times 10^2)$$

2. Multiply the coefficients and add the exponents

$$(1.5 \times 7.3) \times (10^3 \times 10^2) = (10.95 \times 10^5)$$

3. Convert result to scientific notation

$$10.95 \times 10^5 = 1.095 \times 10^6$$

Dividing numbers written in scientific notation is done using a similar process.

1. Group the coefficients and exponents together

$$(8.5 \times 10^5) / (2.3 \times 10^3) = (8.5 / 2.3) \times (10^5 / 10^3)$$

2. Divide the coefficients and subtract the exponents

$$(8.5 / 2.3) \times (10^5 / 10^3) = (3.7 \times 10^2)$$

3. Convert result to scientific notation (if needed)

3.7×10^2 is already in proper scientific notation

II. Practice Problems

1. $(3.7 \times 10^4) \times (9.1 \times 10^2)$

2. $(-4.4 \times 10^3) \times (6.0 \times 10^9)$

3. $(9,6 \times 10^{-5}) \times (7.1 \times 10^{-4})$

4. $(5.8 \times 10^8) \times (3.5 \times 10^{-3})$

5. $(8.4 \times 10^{-6}) \times (1.1 \times 10^{-7})$

6. $(8.0 \times 10^{12}) \times (6.4 \times 10^5)$

7. $(-7.2 \times 10^3) \times (-5.3 \times 10^{-4})$

8. $(1.1 \times 10^{-11}) \times (7.1 \times 10^{-14})$

9. $(9.5 \times 10^8) \times (5.0 \times 10^{-5})$

10. $(-3.9 \times 10^6) \times (4.9 \times 10^{-5})$

11. $(8.9 \times 10^5) / (1.8 \times 10^2)$

12. $(-3.7 \times 10^9) / (6.4 \times 10^7)$

13. $(2.3 \times 10^{-5}) / (1.0 \times 10^{-4})$

14. $(6.2 \times 10^8) / (9.4 \times 10^{-3})$

15. $(6.9 \times 10^{-9}) / (2.2 \times 10^{-7})$

16. $(7.5 \times 10^2) / (1.8 \times 10^5)$

17. $(-3.7 \times 10^9) / (6.3 \times 10^{10})$

18. $(-2.3 \times 10^{-5}) / (-7.0 \times 10^{-4})$

19. $(2.6 \times 10^3) / (2.0 \times 10^{-8})$

20. $(8.8 \times 10^{-9}) / (2.2 \times 10^7)$

III. Challenge Problems

1. The mass of one oxygen atom is 2.66×10^{-26} kg. A cylinder contains 5.97×10^{23} oxygen atoms. What is the mass of the oxygen?

2. The average distance from Earth to the sun is 1.5×10^{11} m. The speed of light is 3×10^{8} m/s. Approximately how long does it take for light to travel from the sun to Earth?

3. Find the student's error:

$$(4.6 \times 10^{7}) \times (3.8 \times 10^{-4}) = (4.6 \times 3.8) \times (10^{7} \times 10^{-4})$$

$$(4.6 \times 3.8) \times (10^{7} \times 10^{-4}) = (17.48 \times 10^{11})$$

$$17.48 \times 10^{11} = 1.748 \times 10^{12}$$

Answer Key

Practice Problems

1. 3.4×10^7

2. -2.6×10^{13}

3. 6.8×10^{-8}

4. 2.0×10^4

5. 9.2×10^{-13}

6. 5.1×10^{18}

7. 3.8

8. 7.8×10^{-25}

9. 4.8×10^5

10. -1.9×10^2

11. 4.9×10^3

12. -5.8×10^1

13. 2.3×10^{-1}

14. 6.6×10^{10}

15. 3.1×10^{-2}

16. 4.2×10^{-3}

17. -5.9×10^{-2}

18. 3.3×10^{-2}

19. 1.3×10^{11}

20. 4.0×10^{-16}

III. Challenge Problems

1. 1.59×10^{-2} kg

2. 500 sec

3. $(4.6 \times 3.8) \times (10^7 \times 10^{-4}) = (17.48 \times 10^{11})$
   When multiplying with scientific notation, the exponents should be added. $7 + -4 = 3$,
     not 11