

1. Find each. Write answer in both Scientific Notation and Standard Notation.

a. $(2.8 \times 10^4)(3.75 \times 10^3)$

$$(28000)(3750)$$

$$105,000,000$$

$$1.05 \times 10^8$$

b. $\frac{1.21 \times 10^4}{4.4 \times 10^9}$

$$0.275 \times 10^{-5}$$

$$2.75 \times 10^{-6}$$

$$0.00000275$$

Simplify each. Make sure answers don't have exponents that are zero or negative.

2. $\frac{-4c^{-3}d^2}{6c^{-1}m^0n^5} = \frac{-217d^2}{3c^3n^5}$

3. $\left(\frac{5^{-2}x^7y^{-4}}{3v^5}\right)^{-1}$

$$= \left(\frac{x^7}{75w^5y^4}\right)^{-1}$$

$$= \frac{75w^5y^4}{x^7}$$

Sec 8-3: Multiplication Properties of Exponents

Property

Multiplying Powers With the Same Base

For every nonzero number a and integers m and n , $a^m \cdot a^n = a^{m+n}$.

When you multiply powers with the same base you

ADD EXPONENTS

$$\begin{aligned} 4. \quad & \frac{-A^2 B^{-8} C^2 A^{-9} B^5 C B^3}{\cancel{-1} A^{-7} B^0} = \frac{-1 C^3}{A^7} \\ & = \frac{-C^3}{A^7} \end{aligned}$$

$$\begin{aligned} 5. \quad & (-2m^4 n^{-3} p)(4^2 m^5 n^2 p^6) \\ & (-2)(16) = \frac{-32 m^9 p^7}{n} \end{aligned}$$

Evaluate each for $A = -4$ $B = 6$ $C = 2$

Give fractional answers in reduced form (no decimals)

$$\begin{aligned} 6. \quad A^{-2}BC^3 &= \frac{BC^3}{A^2} = \frac{(6)(2)^3}{(-4)^2} \\ &= \frac{48}{16} = 3 \end{aligned}$$

Evaluate each for $A = -4$ $B = 6$ $C = 2$

Give fractional answers in reduced form (no decimals)

$$\begin{aligned} 7. \quad \left(\frac{AB^{-2}}{C^{-2}} \right)^{-1} &= \left(\frac{AC^2}{B^2} \right)^{-1} = \frac{B^2}{AC^2} \\ &= \frac{(6)^2}{(-4)(2)^2} = \frac{36}{-16} \\ &= -\frac{9}{4} \end{aligned}$$

Simplify.

4. $(4a^{-9}bc^4)(2a^{-2}b^7c^{-2})(5a^8b^{-1}c^5)$

$$\frac{40 b^7 c^7}{a^3}$$

Simplify.

5. $6(3^{-2}g^{10}h^{-4})(4g^{-3}h^2)$

$$\frac{6g^{10}}{9h^4} \cdot 4g^{-3}h^2 = \frac{8g^7}{3h^2}$$

Find product without a calculator. Give your answer in Scientific Notation.

$$(2.5 \times 10^4)(3 \times 10^5)$$

$$7.5 \times 10^9$$

$$(6 \times 10^{-5})(4 \times 10^{-3})$$

$$\begin{array}{r} 24 \times 10^{-8} \\ \hline 2.4 \times 10^{-7} \end{array}$$

Simplify each.

$$1. \quad Q^4 \cdot Q^{-3} \cdot Q^7 \quad Q^8$$

$$2. \quad (Q^6)^3 \quad Q^{18}$$

Section 8-4: More Multiplication Properties of Exponents

Raising a Power to a Power:

$$(x^a)^b = x^{a \cdot b} \quad \text{Multiply exponents}$$

Property

Raising a Product to a Power

For every nonzero number a and b and integer n , $(ab)^n = a^n b^n$.

Every part inside the parentheses is raised to the exponent that's on the outside.

Simplify each. Make sure answers don't have any exponents that are zero or negative.

1. $(h^4)^3$ h^{12}

2. $(P^{-6})^7$ $P^{-42} = \frac{1}{P^{42}}$

3. $(D^9)^{-4}$ $\frac{1}{D^{36}}$

4. $(B^{-3})^{-5}(B^3)^4$
 $B^{15} \cdot B^{12} = B^{27}$

Simplify

5. $(7m^3n^5)^2$ $49m^6n^{10}$
 ~~$7m^6n^{10}$~~

Simplify. Make sure your answer doesn't have any exponents that are negative or zero.

$$6. \quad (3a^4b^{-3})^2(2a^2b^5)^3 \\ (9a^8b^{-6})(8a^6b^5) = 72a^{14}b^9$$

$$7. \quad (4m^3n^{-5})^{-2} = \frac{n^{10}}{16m^6}$$

8. $((8x^6y^4)^2(2xy^7))^0$

|

9. $\left(\frac{2^{-2}a^4b^{-3}}{a^{-1}b^5}\right)^{-3} = \left(\frac{a^5}{4b^8}\right)^{-3}$
 $= \left(\frac{4b^8}{a^5}\right)^3 = \frac{64b^{24}}{a^{15}}$

10. $(6E^5D^{-2})^{-2} \cdot (2E^{-2}D^4)^3$

$$= \frac{6^{-2} E^{-10} D^4}{36 E^{10}} \cdot \left(\frac{2^3 D^{12}}{E^6} \right) = \frac{2 D^{16}}{9 E^{16}}$$

Simplify each.

11. $(((((w^4x^3)^2)^5)^3)^2)$

$w^{240} x^{180}$

12. $(((((a^8b^5)^3)^0)^4)^5)^6$

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You can now finish Hwk #12

Sec 8-4

Pages 413-414

Problems 4-8, 13, 15, 17, 20-22, 51

IXL #7 - V.4 & W.1 due Friday at 4pm!