

Exponent Rules

Grade 8 | Supported practice

Name: _____ Class: _____ Date: _____

My goals

I can multiply and divide terms that have the same letter.

I can use zero and negative exponents to simplify expressions.

Remember

When multiplying the same base, ADD exponents: $a^2 \times a^3 = a^5$.

When dividing the same base, SUBTRACT exponents: $a^5 \div a^2 = a^3$.

Multiply or divide the number parts separately. x^3 means $x \times x \times x$.

Try these examples with me

$$(2a^2)(3a^3) = (2 \times 3) \times a^{(2+3)} = 6a^5$$

$$(12b^5) \div (3b^2) = (12 \div 3) \times b^{(5-2)} = 4b^3$$

Part 1 Multiply and divide

For each question, simplify. Write at least one step.

1. $x^2 \times x^3$

Hint: $x^{(2+3)} = x^{\underline{\hspace{1cm}}}$

Answer: _____

2. $(2a^2)(3a^3)$

Hint: $(2 \times 3)a^{(2+3)} = \underline{\hspace{1cm}}$

Answer: _____

3. $(-2p^3)(4p^2)$

Hint: multiply the number parts first.

Answer: _____

4. $(3m^2 n)(2m n^3)$

Hint: group m with m; group n with n.

Answer: _____

5. $x^7 \div x^3$

Hint: $x^{(7-3)} = \underline{\hspace{1cm}}$

Answer: _____

6. $(12a^5) \div (3a^2)$

Hint: divide 12 by 3; then subtract $5 - 2$.

Answer: _____

7. $(10m^4 n^2) \div (5m^2 n)$

Hint: treat m and n separately.

Answer: _____

Exponent Rules

Name: _____ Part 2 Zero and negative exponents

Remember

$a^0 = 1$ when a is not 0. For example: $9^0 = 1$.

$a^{-n} = 1/a^n$. For example: $x^{-2} = 1/x^2$.

If a letter is in a denominator, assume it is not zero.

Look at what is raised to zero

$5a^0 = 5 \times 1 = 5$ but $(5a)^0 = 1$.

$x^2 \div x^5 = x^{(2-5)} = x^{-3} = 1/x^3$.

Part 2 Practice

Simplify. Give an answer without negative exponents.

8. 8^0

Hint: any nonzero number to the power 0 is 1.

Answer: _____

9. $5a^0$

Hint: only a has the exponent 0.

Answer: _____

10. $(5a)^0$

Hint: the brackets are part of the base.

Answer: _____

11. $x^3 \div x^3$

Hint: $x^{(3-3)} = x^0$.

Answer: _____

12. $x^2 \div x^5$

Hint: $x^{(2-5)} = x^{-3}$.

Answer: _____

13. $(6b^2) \div (3b^5)$

Hint: divide the numbers, then subtract exponents.

Answer: _____

14. 4^{-2}

Write this as a positive fraction.

Answer: _____

15. A student says $6x^0 = 1$. Correct the answer.

Hint: compare $6x^0$ with $(6x)^0$.

Work: _____