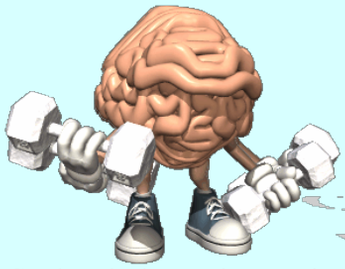
Curriculum Outcome

(N1) Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by: representing repeated multiplication using powers; using patterns to show that a power with an exponent of zero is equal to one; solving problems involving powers.

(N2) Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.

Student Friendly:

"Exponent Law for a Quotient of Powers"



Grade 9 Warm Up

Get those brain muscles pumping!!!

Quiz TIME

Section 2.4 Exponent Laws 1

Write each expression as a product and then evaluate the following:

1) $3^2 \times 3^2$

(3)(3) (3)(3)

$= 3^4$

2) $2^2 \times 2^5$

(2)(2) (2)(2)(2)(2)(2)

$= 2^7$

Do you notice anything???

3) $(-5)^2 \times (-5)^4$

$= (-5)^6$

Exponent Law for a Product of Powers

To multiply powers with the same base, add the exponents.

$$a^m \times a^n = a^{m+n}$$

must be the same base

The variable "a" is any interger, except 0.
The variable "m" and "n" are any whole numbers.

Write each of the following as a single power and then evaluate.

1) $7^2 \times 7^4$

$= 7^6$

$= 117\,649$

2) $(-2)^5 \times (-2)^3$

$= (-2)^8$

$= 256$

3) $4^5 \times 4^1$

$= 4^6$

$= 4096$

What happens when we divide powers with the same base?

Do you notice anything???

1) $\dfrac{2^6}{2^2} = \dfrac{(2)(2)(2)(2)(2)(2)}{(2)(2)}$

$= 2^4$

Exponent Law for a Quotient of Powers


To divide powers with the same base, subtract the exponents.

must be the same base

$$a^{m} \div a^{n} = a^{m-n}$$


What happens when we divide powers with the same base?

2) $\dfrac{7^9}{7^4}$

$= (7)^5$

$= 16\,807$

3) $\dfrac{(-5)^7}{(-5)^3}$

$= (-5)^4$

$= 625$

$$\frac{(x^2)(x^3)(x^8)}{x^{10}} = \frac{x^{13}}{x^{10}}$$

$$= x^3$$

Remember to always use BEDMAS when evaluating

Simplify first (using exponent law I) THEN Evaluate each of the following:

1) $3^{10} \div 3^{6} + 3^{2}$

2) $-2^{3}(2^{9} \div 2^{7}) - 2^{1}$

3) $\dfrac{10^{1003}}{10^{1000}} - 1$

1) $3^{10} \div 3^{6} + 3^{2}$

$3^{4} + 3^{2}$ ← (simplified part)

$81 + 9$ ← Evaluate

$= 90$

2) $-2^3(2^9 \div 2^7) - 2^1$

$-(2^3)(2)^2 - 2^1$

$-2^5 - 2^1$ Simplified

$-32 - 2$

-34 Evaluated

3) $\dfrac{10^{1003}}{10^{1000}} - 1$

$10^3 - 1$ simplified

$1000 - 1$

999 Evaluated

MUST COPY OUT QUESTION AND THEN ANSWER

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Questions :
3,4acegh, 5bdfh,