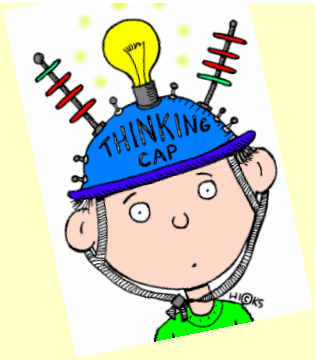
Grade 9 Warm Up



Simplify using exponent law 1 or 2, then evaluate

1) $(2^4)^3$ 2) $[(-2)^2 \times (-2)^4]^2$ 3) $[(-1)^{11}]^3$

Write each expression as a product or quotient of powers. Then evaluate.

1) $[(-3) \times (5)]^2$

2) $\left(\frac{6}{5}\right)^4$

Simplify then evaluate:

$$\frac{(3^2 \times 3^4)^5}{(3^2)^5 (3^6)^2}$$

Grade 9 Warm Up

Simplify using exponent law 1 or 2, then evaluate

1) $(2^4)^3$

2^{12}

4096

2) $[(-2)^2 \times (-2)^4]^2$

$(-2)^6$

$(-2)^{12}$

4096

3) $[(-1)^{11}]^3$ 33

(-1)

-1

Write each expression as a product or quotient of powers. Then evaluate.

1) $[(-3) \times (5)]^2$

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

9×25

225

2) $\left(\frac{6}{5}\right)^4$

$\frac{6^4}{5^4} = \frac{1296}{625}$

2.07

Simplify then evaluate:

$\frac{(3^2 \times 3^4)^5}{(3^2)^5 (3^6)^2}$

$3^{10} \times 3^{12}$

$(3^6)^5 = 3^{30}$

$\frac{3^{30}}{3^{22}}$

3^8

$= 6561$

Homework Solutions
Check Textbook for Answers

ANY QUESTIONS???

9. $(-base)^{odd}$

$-$

$(-base)^{even}$

$+$

What about a power of a quotient?

Let's Investigate

$\left(\frac{4}{5}\right)^3$

Step 1) Write the above as a repeated multiplication.

$\left(\frac{4}{5}\right)\left(\frac{4}{5}\right)\left(\frac{4}{5}\right)$

Step 2) Look at the numerators can you express that as a single power

4^3

$\frac{4^3}{5^3}$

Step 3) Look at the denominators can you express that as a single power

5^3

What did you discover?

Exponent Law for a Power of a Quotient

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

BUT $b \neq 0$

examples

$$\left[\frac{4^3}{5^2}\right]^7 = \frac{4^{21}}{5^{14}}$$

$$\left[2^8 \div 3^2\right]^2 = 2^{16} \div 3^4$$

$$\frac{2^{16}}{3^4}$$

Evaluating Powers of Product and Quotients

$$[(-6) \times 4]^2$$

Method 1

Use the exponent law for a power of a product

$$[(-6) \times 4]^2$$
$$= (-6)^2 \times 4^2$$
$$= 36 \times 16$$
$$= 576$$

Method 2

Use the order of operations

$$[(-6) \times 4]^2$$
$$= [-24]^2$$
$$= 576$$

You Decide

Try some more (use which ever method you want)

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

$-(10)^3$

$(-1)(1000)$

-1000

3) $\left(\frac{21}{-3}\right)^3$

$\frac{21^3}{-3^3}$

$(-7)^3$

-343

Applying Exponent Laws and Order of Opertations

$(5 \times 2)^3 + (2^8 \div 2^5)^4$

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

$5^3 \times 2^3 + 2^{12}$

$125 \times 8 + 4096$

$1000 + 4096$

5096

$(5 \times 2)^3 + (2^8 \div 2^5)^4$

$10^3 + (2^3)^4$

$1000 + 2^{12}$

$1000 + 4096$

5096

$2 \times 2 \times 2 \times 2 \times 2 \times 2$

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

$$(4^5)^2 - (5^2)^2$$

$$4^{10} - 5^4$$

$$1048576 - 625$$

$$1047951$$

$$[(-2)^3 \times (-2)^2] - [(-3)^3 \div (-3)^2]$$

$$(-2)^5 - (-3)^1$$

$$-32 - (-3)$$

$$-32 + 3$$

$$-29$$

Class/Homework

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