

Grade 9 Warm Up



Simplify then Evaluate

1) $(-2)^7 \div (-2)^3 - (-2)^5 \div (-2)^2$ 2) $(-4)^9 \div (-4)^5 + (-4)^5 \div (-4)^2$

$(-2)^4 - (-2)^3 = 16 - (-8)$
 $= 24$

3) $\frac{2^4(2^3 \div 2^2) - 4^0}{3(3^4 + 2^2)}$

$\frac{2^4(2^1) - 4^0}{3(81 + 4)}$

$\frac{2^5 - 4^0}{3(85)}$

$\frac{32 - 1}{255}$

$\frac{31}{255} \sim 0.12$

$(-4)^4 + (-4)^3$
 $256 + (-64)$
 192



Section 2.5 Exponent Laws II



Fill in the following chart

Power	As Repeated Multiplication	As a Product of Factors	As a power
$(3^2)^5$	$(3^2)(3^2)(3^2)(3^2)(3^2)$	$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$	3^{10}
$(4^2)^3$	$(4^2)(4^2)(4^2)$	$4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$	4^6
$[(-2)^4]^3$	$(-2)^4 (-2)^4 (-2)^4$	$(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)$	$(-2)^{12}$

What do we notice?

$$(2^3)^4 = 2^{12} = 4096$$



Exponent Law for a Power of a Power



To raise a power to a power, multiply the exponents.

$$(a^m)^n = a^{mn}$$



Try this



Express the following as a single power

1) $(5^7)^8$
 5^{56}

2) $(10^2)^3$
 10^6

3) $[(-2)^4]^3$
 $(-2)^{12}$

Express the following as a single power then evaluate

1) $(2^3)^2$
 $2^6 = 64$

2) $(5^2)^3$
 $5^6 = 15625$

3) $[(-3)^2]^4$
 $(-3)^8 = 6561$

Fill in the following chart

Power	As Repeated Multiplication	As a Product of Factors	As a product of Powers
$(2^3 \times 3^2)^2$	$(2^3 \times 3^2)(2^3 \times 3^2)$	$2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$	$2^6 \times 3^4$
$((-3) \times 5)^2$	$(-3) \times 5 (-3) \times 5$	$(-3) \cdot 5 \cdot (-3) \cdot 5$	$(-3)^2 \times 5^2$

Exponent Law for a Power of a Product



What is in the brackets has to be multiplied.

$$(ab)^m = a^m b^m$$

$$(7^3 \times 2^5)^4 = 7^{12} \times 2^{20}$$

Try this



Write as a power

$$1) (3^5 \times 4^7)^6 = 3^{30} \times 4^{42} =$$

$$2) (4^5 \div 3^4)^7 = 4^{35} \div 3^{28}$$

Simplify
then
evaluate.

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

$$\begin{aligned} &= 2^4 \times 3^2 \\ &= 16 \times 9 \\ &= 144 \end{aligned}$$

$$(4^3 \div 2^2)$$

$$\begin{aligned} &= 4^3 \div 2^2 \\ &= 64 \div 4 \\ &= 16 \end{aligned}$$

Class/Homework

Page 84

4, 5abc, 6, 7, 8ab, 9,

10abef, 16, 17

$$\left(\frac{10}{2}\right)^2 = \frac{10^2}{2^2} = \frac{100}{4} = 25$$