Unit 2: Powers and Exponent Laws   Name: _____

Lesson 2.4: Exponent Laws 1

1. Write each product as a single power.
    a) $4^3 \times 4^2$ b) $5^0 \times 5^0$ c) $(-2)^2 \times (-2)^4$

    4^5 $5^0 = 1$ $(-2)^6$

    d) $-6^3 \times 6^1$ e) $(-7)^0 \times (-7)^2$ f) $(-9)^6 \times (-9)^3$

    $-(6)^4 = -6^4$ $(-7)^2$ $(-9)^9$

2. Write each quotient as a single power.
    a) $8^7 \div 8^5$ b) $10^4 \div 10^0$ c) $(-1)^6 \div (-1)^3$

    8^2 10^4 $(-1)^3$

    d) $\dfrac{-3^4}{3^4}$ e) $\dfrac{(-9)^{10}}{(-9)^5}$ f) $\dfrac{11^9}{11^6}$

    -3^0 $(-9)^5$ 11^3

3. Express as a single power.
    a) $2^3 \times 2^6 \div 2^9$ b) $(-5)^8 \div (-5)^4 \times (-5)^3$ c) $\dfrac{6^3 \times 6^5}{6^2 \times 6^4} = \dfrac{6^8}{6^6} = 6^2$

    $2^9 \div 2^9$ $(-5)^4 \times (-5)^3$

    2^0 $(-5)^7$

    1

    → use exponent laws.
    → find the answer.

4. Simplify then evaluate.
    a) $2^2 - 2^0 \times 2 + 2^3$ b) $(-2)^6 \div (-2)^5 - (-2)^5 \div (-2)^3$ c) $-2^2(2^3 \div 2^1) - 2^3$

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

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

    $= 2 + 8$ $= -6$ $= -16 - 8$

    $= 10$ $= -24$

5. Simplify, then evaluate.

a) $4^3 \div 4^2 + 2^4 \times 3^2$

$= 4^1 + 2^4 \times 3^2$
$= 4 + 16 \times 9$
$= 4 + 144$
$= 148$

b) $3^2 + 4^2 \times 4^1 \div 2^3$

$= 3^2 + 4^3 \div 2^3$
$= 9 + 64 \div 8$
$= 9 + 8$
$= 17$

c) $\dfrac{3^4}{3^3} + \dfrac{4^2 \times 4^0}{2^4}$

$= 3^1 + \dfrac{4^2}{2^4}$
$= 3 + \dfrac{16}{16}$
$= 3 + 1 = 4$

6. Write each relationship as a product of powers or a quotient of powers.

a) One million is 1000 times as great as one thousand. $10^6 = 10^3 \times 10^3$

b) One billion is 1000 times as great as one million. $10^9 = 10^3 \times 10^6$

c) One hundred is one-tenth of one thousand. $10^2 = 10^3 \div 10$

d) One is one-millionth of one million. $1 = 10^6 \div 10^6$

e) One trillion is 1000 times as great as one thousand million. $10^{12} = 10^3 \times 10^9$

7. Identify, then correct any errors in these answers.
Explain how you think the errors occurred.

a) $5^3 \times 5^2 = 5^6$

They multiplied the exponents.

Answer: 5^5

b) $2^3 \times 4^2 = 8^5$

They mult. the bases, also NO exp. laws for diff. bases

c) $(-3)^8 \div (-3)^4 = (-3)^4$

Solution is correct

d) $1^2 \times 1^4 - 1^3 = 1^3$

$= 1^6 - 1^3$

They sub. the exp.

e) $\dfrac{4^2 \times 4^4}{4^2 \times 4^1} = 4^2$

$= \dfrac{4^6}{4^3}$

$= 4^3$

They divided the exponents.