Name_____

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1.3 Exponents

To show repeated multiplication, you write a number in **exponential form**. We often use exponential form when we use prime factoring and scientific notation. An exponent tells you how many times to repeat the multiplication of the base.

5^3 ← exponent

The base, 5, is used as a factor 3 times; 5 * 5 * 5.

Let's practice by writing numbers in **exponential form**:

_____ 6 * 6 * 6 * 6 _____ 3 * 3 * 3 * 3 * 3 _____ 3 * 3 * 3

_____ 7 * 7 _____ 9 * 9 * 9 * 9 _____ 2 * 2 * 2 * 2

Let's practice by writing the **repeated** multiplication.

6^4 = _____ 4^5 = _____

5^3 = _____ 2^3 = _____

2^5

Step 1 – Write the repeated multiplication sentence.

2 * 2 * 2 * 2 * 2

Step 2 – Multiply

8 * 4 = 32

You can use the commutative property of multiplication if it makes the problem easier.

Let's find the value of a few expressions in exponential form.

5^3 = 5 * 5 * 5 = 125 10^4 = _____ = _____

3^5 = _____ = _____ 5^2 = _____ = _____

6^4 = _____ = _____ 12^3 = _____ = _____

9^3 = _____ = _____ 8^5 = _____ = _____

Name_____

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1.3a Operations with Exponents

Multiplying Exponents If the bases are the same… add the exponents $6^3 * 6^3 = 6*6*6*6*6*6 = 6^6$	**Dividing Exponents** If the bases are the same… **subtract** the exponents $7^8 \div 7^3 = \frac{7*7*7*7*7*7*7*7}{7*7*7}$ There will be 5 sevens left… 7^5

Let's practice!

$3^5 * 3^7 = \ 3^{12}$ $\quad$ $5^7 \div 5^2 = \ 5^5$ $\quad$ $2^3 * 2^6 =$_____

$7^3 * 7^5 =$_____ $\quad$ $8^8 \div 8^4 =$_____ $\quad$ $4^4 \div 4^4 =$_____

When 10 is the Base

When the base is 10 the exponent tells you how many 0's to put on a 1.

$10^2 = 10*10 = 100$ … That's a 1 with 2 zeros!
$10^3 = 10*10*10 = 1000$ … That's a 1 with 3 zeros!
$10^4 = 10*10*10*10 = 10{,}000$ … That's a 1 with 4 zeros!

When 0 is the exponent
the answer is always 1

$10^0 = 1$ … That's a 1 with no zeros!

$48^0 = 1$

$6^0 = 1$

Let's practice!

$10^3 * 10^2 = \ 10^5 = \ 100{,}000$

$10^7 \div 10^2 = \ 10^5 = \ 100{,}000$

$10^2 * 10^3 =$ _____ = _____

$10^3 * 10^3 =$ _____ = _____

$10^5 \div 10^5 =$ _____ = _____

$15^7 \div 15^7 =$ _____ = _____