Exponent Notation

- Students will be able to evaluate numbers that are in exponential form
- Students will be able to rewrite natural numbers in factored form and exponent form
- Students will be able to determine the sign of the result when raising a negative base by a power

HW: Lesson 2A worksheet

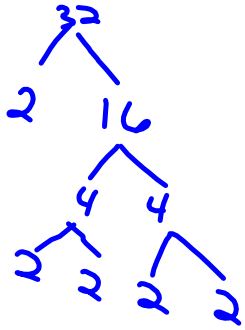
A convenient way to write a product of idential factors is to use exponential or index notation.

For example, 32 can be written as 2 x 2 x 2 x 2 x 2

There are five identical factors, each 2, so we can write this as 2^5

Another example is:

7^4 — 4: exponent; 7: base



Natural number	*Factorised form*	*Exponent form*	*Spoken form*
2	2	2^1	two
4	2×2	2^2	two squared
8	$2 \times 2 \times 2$	2^3	two cubed
16	$2 \times 2 \times 2 \times 2$	2^4	two to the fourth
32	$2 \times 2 \times 2 \times 2 \times 2$	2^5	two to the fifth

Any non-zero number raised to the power zero is equal to 1.

$$a^0 = 1, \quad a \neq 0$$

0^0 is undefined.

$(3x)^0 = 1$

$(3695x^5y^3z^9)^0 = 1$

Negative Bases

A negative base raised to an odd power results in a [ ] value

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

$-2^5 \qquad -32$

A negative base raised to an even power results in a [ ] value

$(-3)^4 = -3 \times -3 \times -3 \times -3 = +81$

$-3^4 = -81$

1. Write in exponent form:

a. $2 \times 3 \times 3 = 2 \cdot 3^2$

b. $3 \times 3 \times 7 \times 7 = 3^2 \cdot 7^2$

c. $3 \times 3 \times 7 \times 5 \times 7 \times 3 \quad 3^3 \cdot 5 \cdot 7^2$

2. Convert each product into natural form:

a. $2 \times 5 \times 7 = 70$

b. $2^4 \times 3 \times 5^2 = 1200$ $16 \times 3 \times 25$

c. $2 \times 3^2 = 2 \times 9 = 18$

d. $2^3 \times 4 \times 5^2 = 800$ $8 \times 4 \times 25$

3. Determine if the result is positive or negative.

a. $(-2)^3$ -8

b. $(-5)^6$ $+15{,}625$

c. $(-1)^{14}$ $+1$

d. $-(-3)^5$ $+243$

e. $-(-2)^4 = -16$

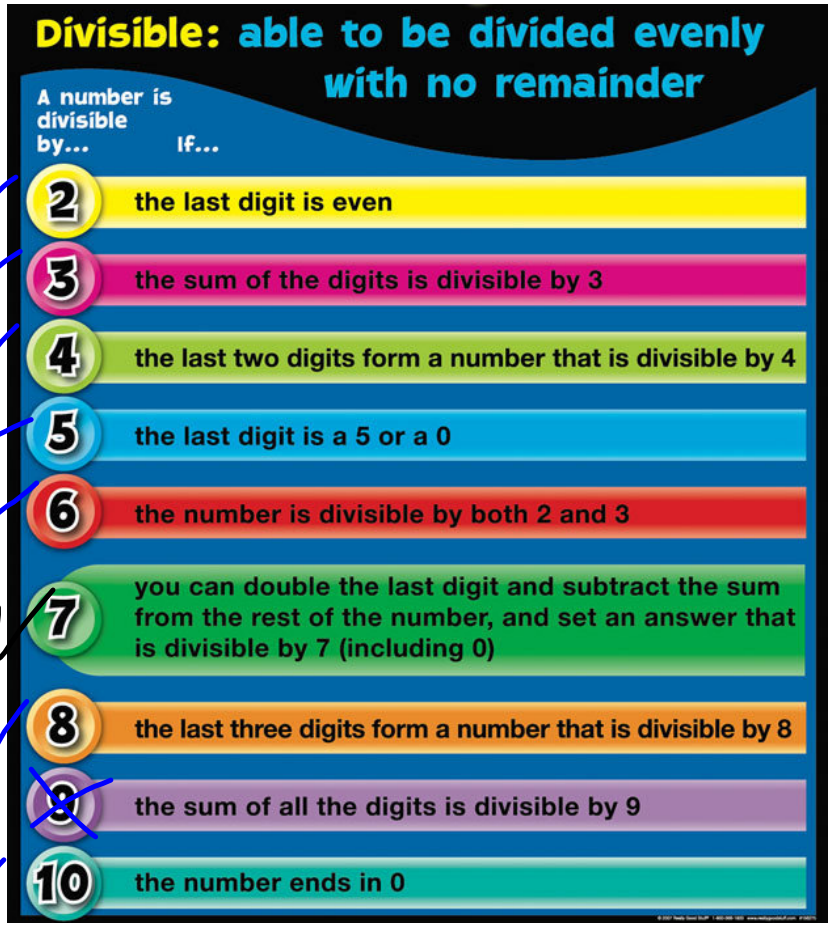
f. $-6^2 = -36$

Factors of Positive Integers

- Students will be able to determine if a number is a factor of a given integer
- Students will be able to list factor pairs of an integer
- Students will be able to determine if a number is prime or composite
- Students will be able to determine the HCF of a pair of integers

HW: Lesson 3A worksheet

Divisibiliy



Which #s are factors of

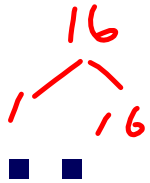
840

105
8 | 840
0
40

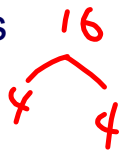
Factor Pairs

When you rewrite a number as a product of factors, we say it is factorised.

16...



...can be factorised in a few different ways



After you have all the ways you can factorise a number written, a complete list of factors for that number has been made

1, 2, 4, 8,16

What is the largest factor, other than itself, for each of the following:

18

2, 9 3, 6

1, 18

1, 2, 3, 6, 9, 18

12
12
0

126

1 126
2 63
3 31
6 21
7 18
9 14

Primes & Composites

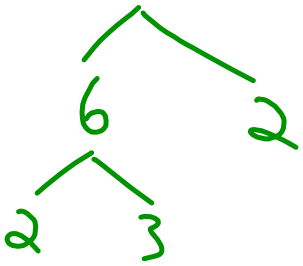
A prime number is a natural number which has exactly two different factors.

A composite number is a natural number which has more than two factors.

Fundamental Theorem of Arithmetic...

Every composite number can be written as the product of prime factors exactly one way (ignoring order) in exponential form.

$12 = 2^2 \cdot 3$



Use Factor Trees to help rewrite an integer in...

...Exponential Form

346

173 2

$2 \cdot 173$

Highest

Common

Factor

The highest common factor of two integers can be found by first expressing the integers into a product of prime factors.

18

1, 2, 3, 6, 9, 18

24

1, 2, 3, 4, 6, 8, 12, 24