

## Polynomials C1: Prime Factorization

Know what prime and composite numbers are

Determine the prime factors of a whole number

### Criterion Sort

Sort the following numbers according to as many different criteria you can think of. Be Creative! (Board Work)

Prime	Composite
2	14
5	64
7	8
17	98
41	21
71	26

## Vocabulary

**Prime Number:** a whole number with exactly two distinct factors; itself and 1.

There are 25 prime numbers below 100. Please list them all. "Eratosthenes' Sieve" may help with this.

→ Primes: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

**Composite Number:** a whole number with three or more factors; a number that is not a prime number.

**Think About It**  
What about 0 and 1?

Not Prime

## Rectangle Activity

Makes as many different rectangles as you can that have an area of 24 units<sup>2</sup>. Sketch these rectangles and label the dimensions and area.

4



6

$$24 = 4 \cdot 6$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 2 \cdot 2 \quad 2 \cdot 3 \end{array}$$

$$(2 \cdot 2)(2 \cdot 3) = 24$$

**Think About It**

What kind of number will have only one possible rectangle?

3



8

$$24 = 3 \cdot 8$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 3 \quad 2 \cdot 4 \\ \quad \swarrow \quad \searrow \\ \quad 2 \cdot 2 \end{array}$$

$$(2 \cdot 2 \cdot 2)(3) = 24$$

**Note:** You can practice factor pairs by playing Factortris

(<http://hotmath.com/games.html>)

2



12

$$24 = 2 \cdot 12$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 2 \quad 2 \cdot 6 \\ \quad \swarrow \quad \searrow \\ \quad 2 \quad 3 \end{array}$$

$$(2)(2 \cdot 2 \cdot 3) = 24$$

1



24

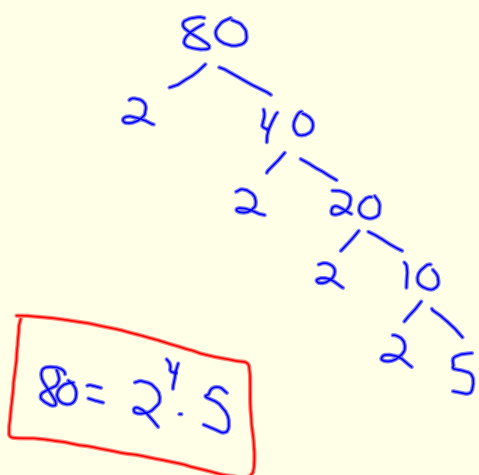
$$24 = 1 \cdot 24$$

## Prime Factorization Techniques

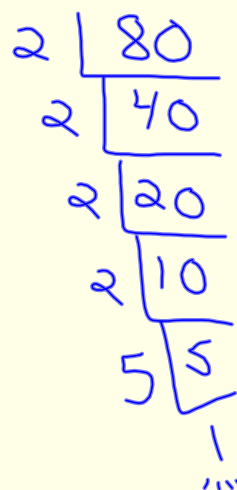
**Prime Factorization:** writing a number as a product of its prime factors.

Find the prime factorization of 80. (Board Work)

Factor Tree

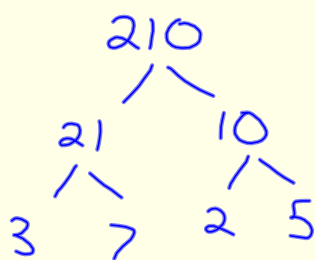


Birthday Cake

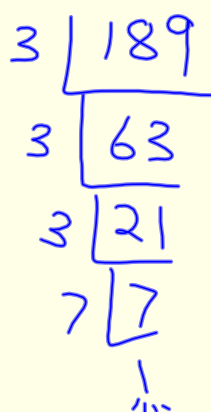


## Prime Factorization Examples

Find the prime factorization of 210 and 189.



$$210 = 2 \cdot 3 \cdot 5 \cdot 7$$



$$189 = 3^3 \cdot 7$$

$$\begin{array}{r} 63 \\ 3 \overline{) 189} \\ \underline{-189} \\ 0 \end{array}$$

# Prime Factorization Practice

*Prime Factorization Practice* (Hand out)

Divisibility Rules on the back of Eratosthenes'  
Sieve handout may prove useful.