

## Warm-up 2/19

**Tell whether the second number is a factor of the first number**

**1.** 50, 6                      **2.** 105, 7

**3.** List the factors of 28.

**Tell whether each number is prime or composite. If the number is composite, write it as the product of two numbers.**

**4.** 11                              **5.** 98

## Warm-up 2/19

**Tell whether the second number is a factor of the first number**

1. 50, 6 NO      2. 105, 7 Yes       $7 \cdot 15 = 105$   
 $105 \div 7 = 15$
3. List the factors of 28. 1, 2, 4, 7, 14, 28

**Tell whether each number is prime or composite. If the number is composite, write it as the product of two numbers.**

4. 11  
prime

5. 98  
composite  
 $2 \cdot 49$  or  $14 \cdot 7$

# Today's Goals

I can...

- write the prime factorization of numbers
- find the GCF of monomials

## Section 8.1: Factors and GCFs

### Factors

~a whole number that divides a number evenly



Find the factors of the number, **36**.

1, 2, 3, 4, 6, 9, 12, 18, 36



**Prime Number:** a number divisible by one and itself only.

**Prime Factorization:**

The list of all prime numbers that are factors of that number.

1, 2, 3, 5, 7, 11, 13, 17, 23, ...

Factors of 36 were:

~~$1 \cdot 36$~~

~~$2 \cdot 18$~~

~~$3 \cdot 12$~~

~~$4 \cdot 9$~~

~~$6 \cdot 6$~~

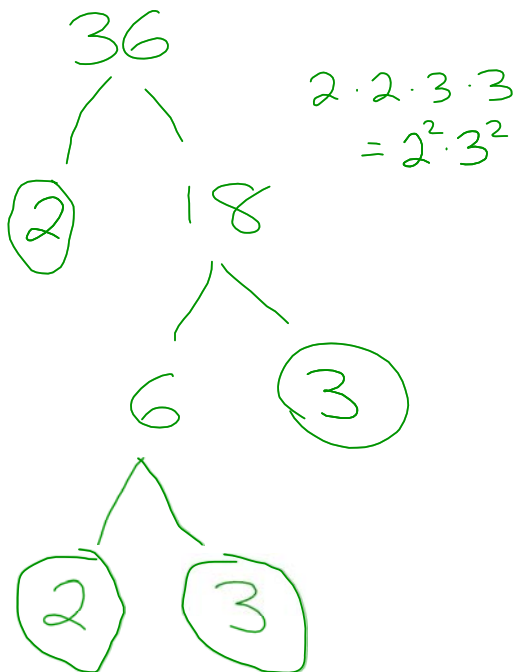
~~$2 \cdot 3 \cdot 6$~~

~~$2 \cdot 2 \cdot 9$~~

$2 \cdot 2 \cdot 3 \cdot 3$  ✓

## Factoring Methods

### Factor Tree Method

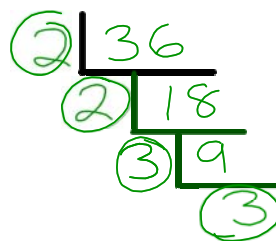


Prime factorization:

Differences:

- May choose any 2 factors to begin with
- Keep branching off until you end with all prime numbers in the circles

### Ladder Method



$$2 \cdot 2 \cdot 3 \cdot 3$$

$$2^2 \cdot 3^2$$

Prime factorization:

- Must start with a prime factor
- Keep dividing by primes until you end with a prime

## Try These!!

Write the prime factorization of each number.

1. 40

3. 49

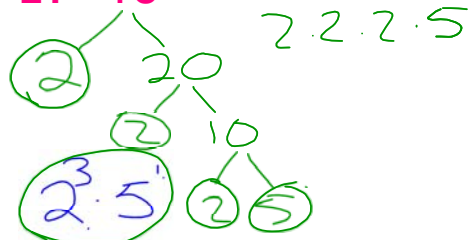
2. 33

4. 19

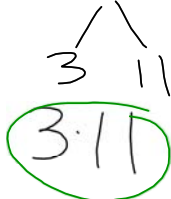
## Try These!!

Write the prime factorization of each number.

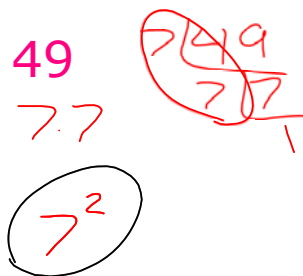
1. 40



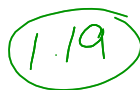
2. 33



3. 49



4. 19





## Common Factors

Common factors: Factors that are shared by numbers or variables

Greatest common factor: (GCF) the largest shared factor

Factors of 16: 1, 2, 4, 8, 16  
Factors of 48: 1, 2, 3, 4, 12, 16, 24, 48

Common factors: 1, 2, 4, 16  
GCF: 16

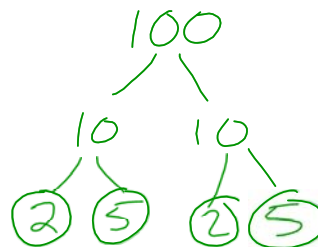
Examples

Find the GCF of each pair of numbers.

100 and 60

$$\begin{array}{cccc} 2 & 2 & 5 & 5 \\ 2 & 2 & 3 & 5 \\ \hline 2 \cdot 2 \cdot 5 = & 20 & & \end{array}$$

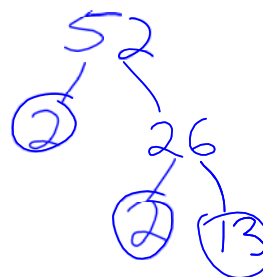
$$\begin{array}{r} 2 \overline{)60} \\ \underline{20} \phantom{0} \\ 40 \\ \underline{40} \\ 0 \end{array}$$



26 and 52

$$\begin{array}{ccc} 2 & 13 \\ 2 & 2 & 13 \\ \hline 2 \cdot 13 = & 26 & \end{array}$$

$$\begin{array}{r} 2 \overline{)26} \\ \underline{26} \\ 0 \end{array}$$



## Try These!!

Find the GCF of the following pairs.

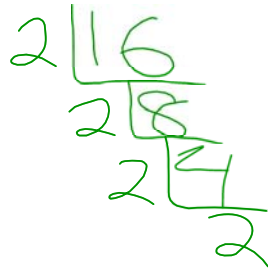
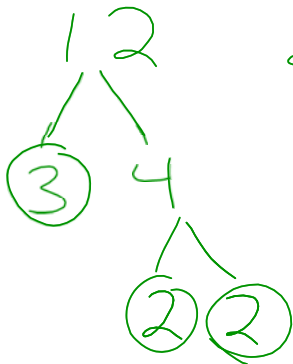
5. 12 and 16

6. 15 and 25

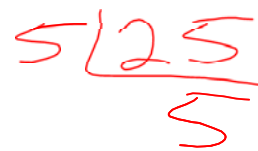
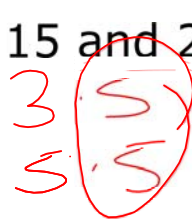
# Try These!!

Find the GCF of the following pairs.

5. 12 and 16  $2 \cdot 2 = 4$



6. 15 and 25  $5$



## GCF of Monomials

$$3x^3 \text{ and } 6x^2$$

$$\begin{array}{l} 3 \cdot x \cdot x \cdot x \\ 2 \cdot 3 \cdot x \cdot x \\ 3 \cdot x \cdot x = 3x^2 \end{array}$$



$$15x^3 \text{ and } 9x$$

$$\begin{array}{l} 3 \cdot 5 \cdot x \cdot x \cdot x \\ 3 \cdot 3 \cdot x \\ 3x \end{array}$$

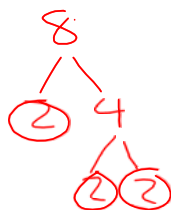


$$8x^2 \text{ and } 7y^3$$

$$2 \cdot 2 \cdot 2 \cdot x \cdot x$$

$$7 \cdot y \cdot y \cdot y$$

$$1$$



## Try These!!

7.  $18g^2$  and  $27g^3$

9.  $8x$  and  $7v^2$

8.  $16a^6$  and  $9b$

### Try These!!

7.  $18g^2$  and  $27g^3$

$2 \cdot 3 \cdot 3 \cdot g \cdot g$   
 $3 \cdot 3 \cdot 3 \cdot g \cdot g \cdot g$

$9g^2$

8.  $16a^6$  and  $9b$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a$

$3 \cdot 3 \cdot b$  (1)

9.  $8x$  and  $7v^2$

$2 \cdot 2 \cdot 2 \cdot x$   
 $7 \cdot v \cdot v$  (1)

$27x^2$  and  $81x^4$

$3 \cdot 3 \cdot 3 \cdot x \cdot x$   
 $3 \cdot 3 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x \cdot x$   
 $27x^2$

$36x^2y^2$  and  $27xy^4$

$$36x^8 \text{ and } 72x^3$$

$$108y^8 \text{ and } 24y^5$$

$$10x^5y^3 \text{ and } 5x^3y^6$$



# Homework

pg. 459 #17-31 (odd)