

## Warm-up 2/10

**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 2/11

**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.**

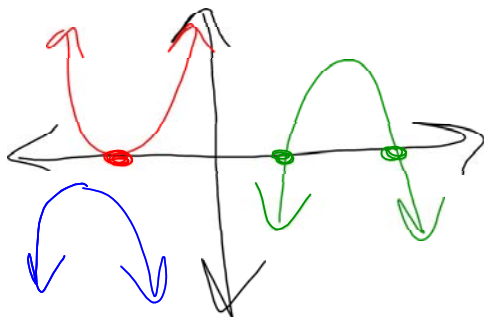
4. 11  
prime

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, 19, 23, ...

Factors of 36 were:

~~$1 \cdot 36$~~

~~$2 \cdot 18$~~

~~$3 \cdot 12$~~

~~$4 \cdot 9$~~

~~$6 \cdot 6$~~

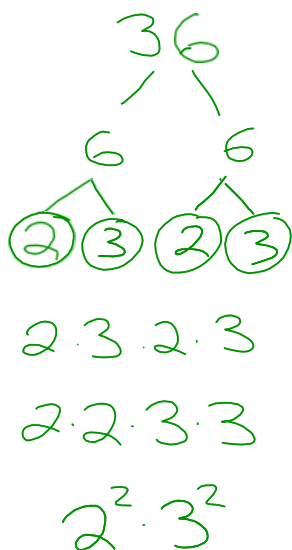
~~$2 \cdot 3 \cdot 6$~~

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

$2 \cdot 2 \cdot 3 \cdot 3$  ✓

## Factoring Methods

### Factor Tree Method

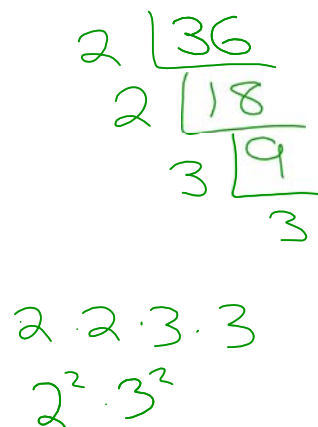


#### Prime factorization:

Differences:

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

### Ladder Method



#### 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

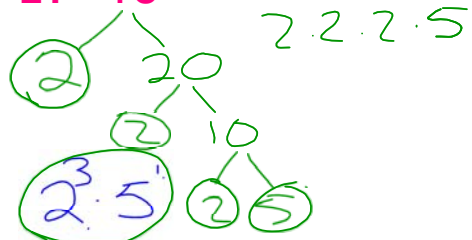
2. 33

4. 19

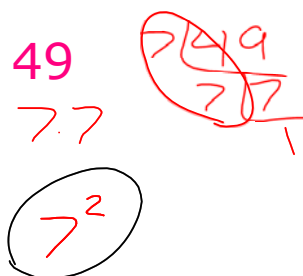
## Try These!!

Write the prime factorization of each number.

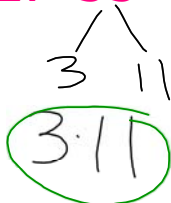
1. 40



3. 49



2. 33



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:  $\underline{1, 2, 4, 8, 16}$

Factors of 48:  $\underline{1, 2, 3, 4, 6, 8, 12, 16, 24, 48}$

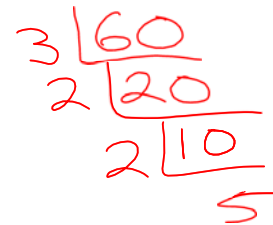
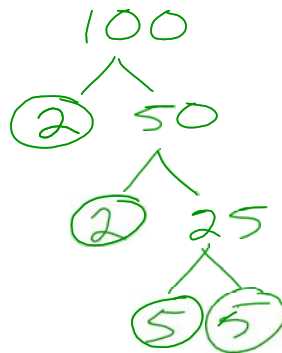
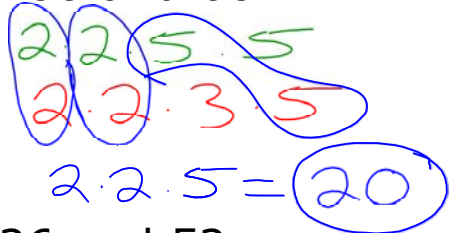
Common factors:  $1, 2, 4, 8, 16$

GCF: 16

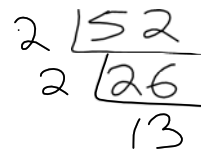
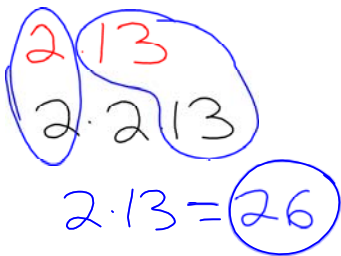
Examples

Find the GCF of each pair of numbers.

100 and 60



26 and 52



## Try These!!

Find the GCF of the following pairs.

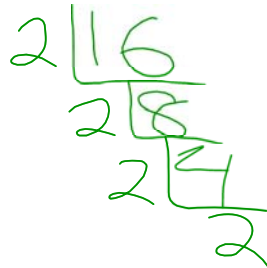
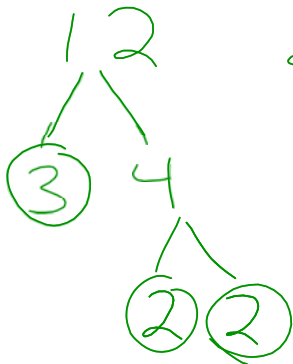
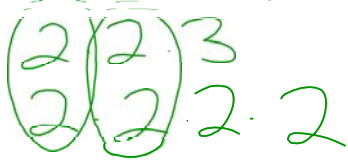
5. 12 and 16

6. 15 and 25

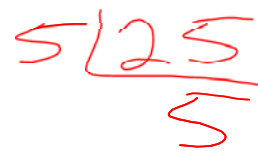
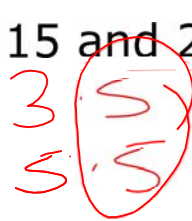
### Try These!!

Find the GCF of the following pairs.

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

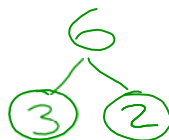
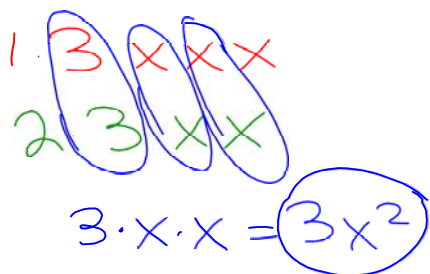


6. 15 and 25  $5$

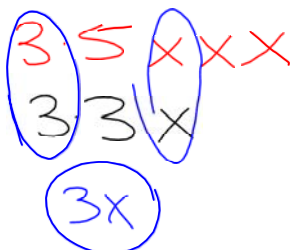


# GCF of Monomials

$3x^3$  and  $6x^2$

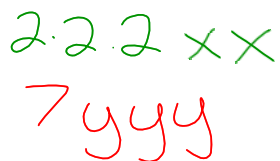


$15x^3$  and  $9x$



$3 \overline{)9}$   
3

$8x^2$  and  $7y^3$



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  $27g^3$

$2 \cdot 3 \cdot 3 \cdot g \cdot g$   
 $3 \cdot 3 \cdot 3 \cdot g \cdot g \cdot g$   
 $9g^2$

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

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

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

$27x^2$  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  $27xy^4$

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

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

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



## Application

A cafeteria has 18 chocolate-milk cartons and 24 regular-milk cartons. The cook wants to arrange the cartons with the same number of cartons in each row. Chocolate and regular milk will not be in the same row. How many rows will there be if the cook puts the greatest possible number of cartons in each row?



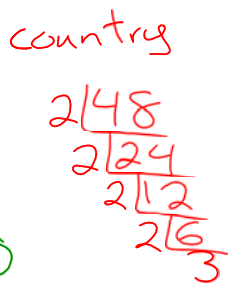
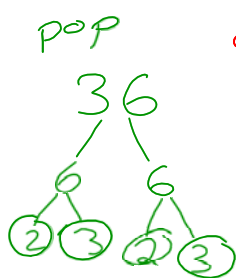
## Try This!!

Adrienne is shopping for a CD storage unit. She has 36 CDs by pop music artists and 48 CDs by country music artists. She wants to put the same number of CDs on each shelf without putting pop music and country music CDs on the same shelf. If Adrienne puts the greatest possible number of CDs on each shelf, how many shelves does her storage unit need?

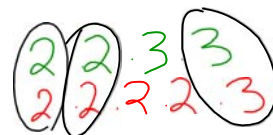


# Try This!!

Adrienne is shopping for a CD storage unit. She has 36 CDs by pop music artists and 48 CDs by country music artists. She wants to put the same number of CDs on each shelf without putting pop music and country music CDs on the same shelf. If Adrienne puts the greatest possible number of CDs on each shelf, how many shelves does her storage unit need?



7 shelves



$2 \cdot 2 \cdot 3 = 12$  CD's on each shelf

$\frac{36}{12} = 3$  pop shelves

$\frac{48}{12} = 4$  country shelves

$3 + 4 = 7$  shelves

# Homework

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