

Prime Factorization and Greatest Common Factor

6th Grade Mathematics

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Prime

A prime number is a whole number, greater than one, whose only two factors are one and itself.

Composite

A composite number is a whole number, greater than one, that is not a prime.

Factors

$$30 = 1 \cdot 30$$

$$30 = 2 \cdot 15$$

$$30 = 3 \cdot 10$$

$$30 = 5 \cdot 6$$

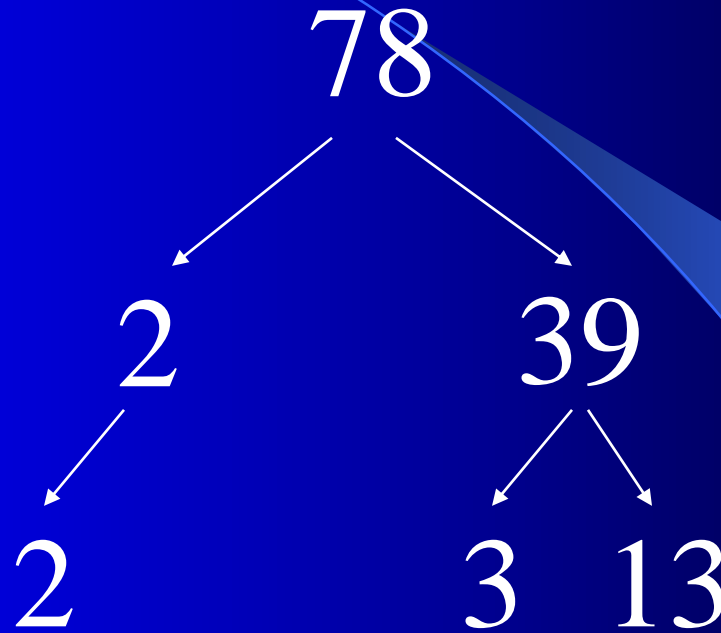
What are the different ways you can multiply two numbers and get thirty?

Factors for 30 are 1,2,3,5,6,10,15,30

Prime Factoring Tree

Find the prime factors of 78.

Each section
is factored
until there
are only
primes left.



$$2 \cdot 3 \cdot 13$$

Factoring by Primes

Find the prime factors of -72 .

$$-72 = -1 \cdot 72$$

$$-72 = -1 \cdot 2 \cdot 36$$

$$-72 = -1 \cdot 2 \cdot 2 \cdot 18$$

$$-72 = -1 \cdot 2 \cdot 2 \cdot 2 \cdot 9$$

$$-72 = -1 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$$

$$-72 = -1 \cdot 2^3 \cdot 3^2$$

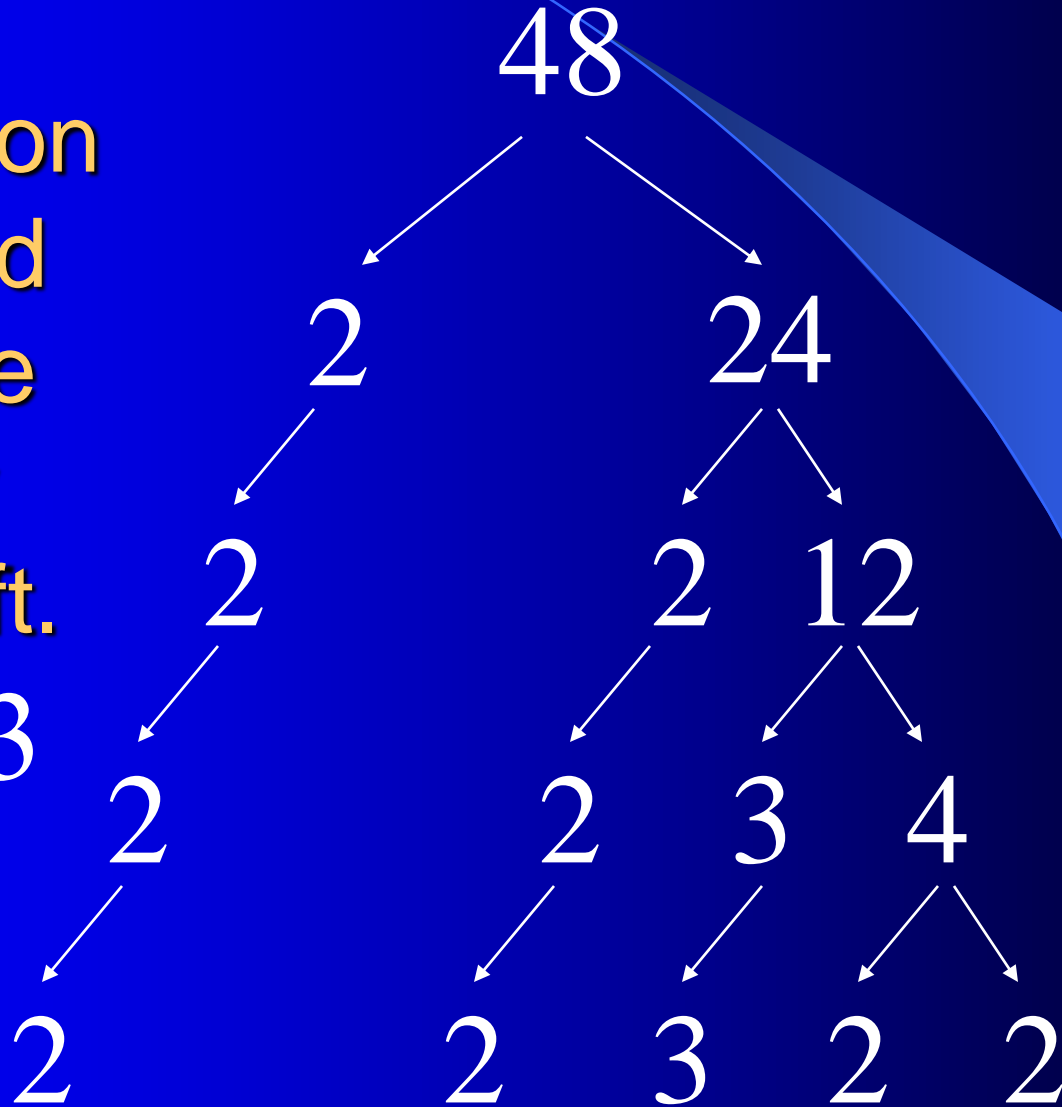
Factor out the smallest prime until you are left with just prime numbers.

Prime Factoring Tree

Find the prime factors of 48.

Each section
is factored
until there
are only
primes left.

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$$
$$2^4 \cdot 3$$

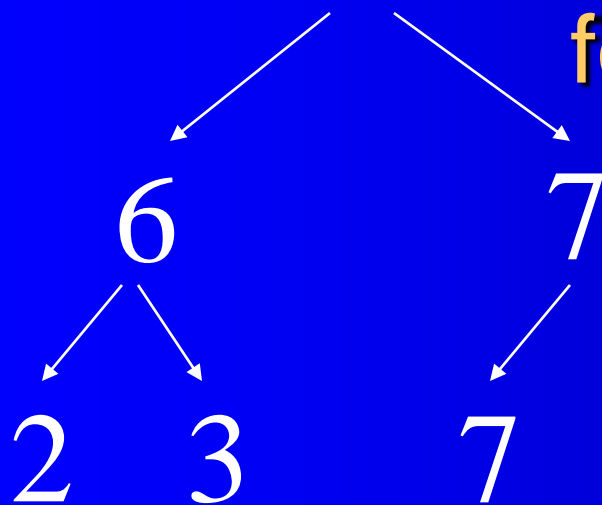


Greatest Common Factors

The greatest common factor of two or more integers is the greatest number that is a factor of all the integers.

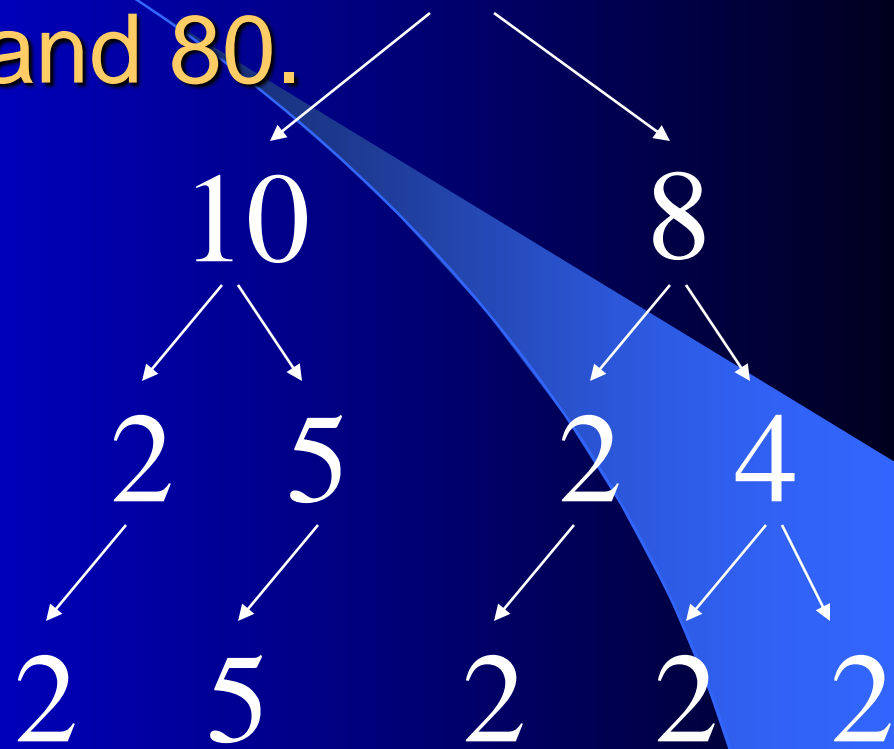
Greatest Common Factor of 42 and 80.

42 Make factor trees 80
for 42 and 80.



$$\boxed{2} \cdot 3 \cdot 7$$

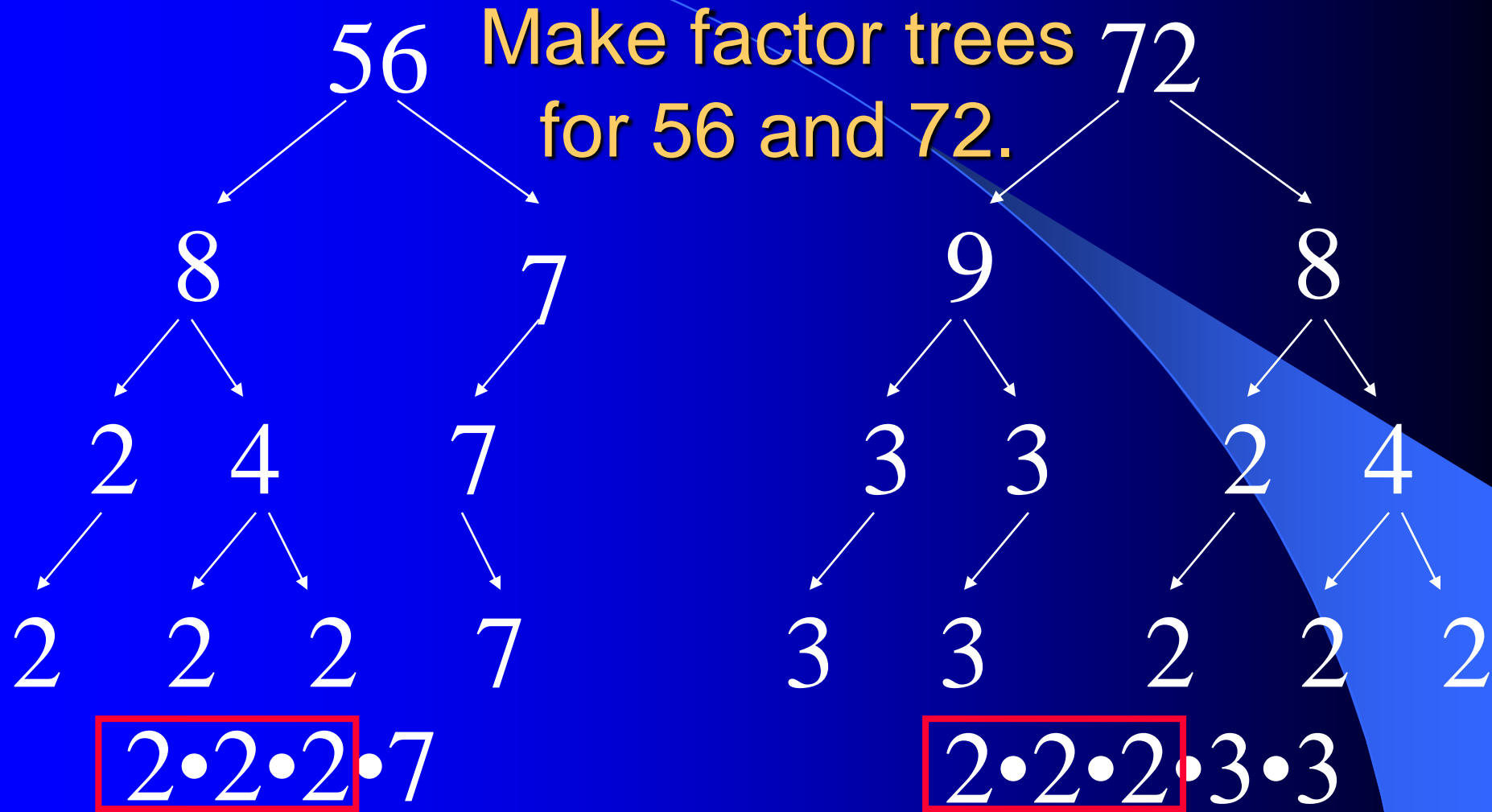
What factors do we
have in common
with each other?



$$\boxed{2} \cdot 2 \cdot 2 \cdot 2 \cdot 5$$

$$\text{GCF} = 2$$

Greatest Common Factor of 56 and 72.



What factors do we have in common with each other?

$$\text{GCF} = 2 \cdot 2 \cdot 2 = 8$$