

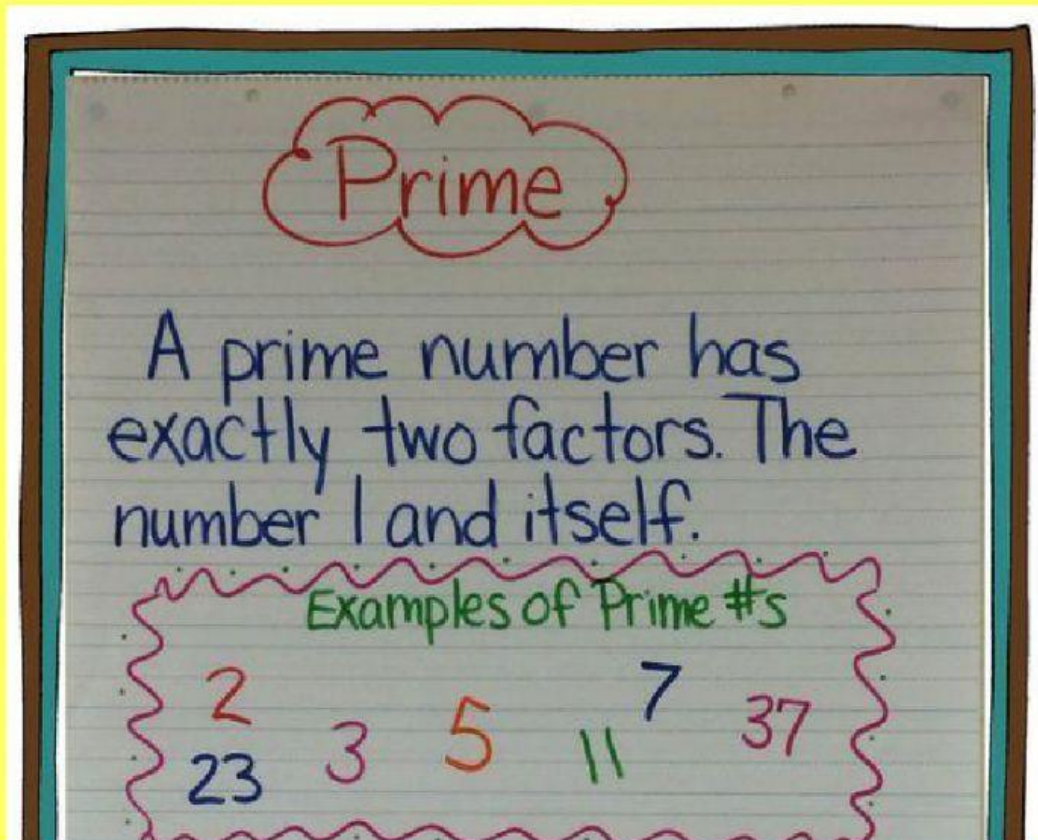
NAME

Mathematics PRIME Factorization March 8th

STUDY THIS MATHEMATICS AND COMPLETE THE WORK
AT THE BOTTOM OF THE UNIT.

In **prime factorization**, we factorize the numbers into **prime numbers**, called **prime factors**.

Review:



There are two methods of prime factorization:

1. Division Method (factor ladder)
2. Factor Tree

Division Method (factor ladder)

Step 1 – Divide the given number by the lowest prime number that divides exactly into it. Always try 2 first.

Step 2 – Divide the quotient by the lowest prime factor. Move to the next prime number if necessary. Repeat the process until you get a quotient of 1.

Step 3 – Write the divisors as a product.

Example of Factor Ladder

Express 84 as a product of its prime factors.

1st – draw a ladder and write 84 on the inside of the ladder. Since, the lowest prime factor is 2 and can go into 84 exactly. Write 2 on the outside.

2nd – Divide: how many groups of twos can you get out of 84 = 42

3rd – Divide the quotient 42 by the lowest prime factor which is 2 again. How many groups of twos can you get of 42? 21

4th – The lowest prime factor 2 cannot evenly go into 21 so, move to the next prime number 3. How many groups of threes can you get out of 21? 7

5th – Divide. 3 goes into 21 seven times. 7 goes into itself once.



Factors: $2 \times 2 \times 3 \times 7$

Exponent: $2^2 \times 3 \times 7$

Equals 84

Factor Tree Method

Step 1 – Find two factors when multiplied together will give you the original number.

Step 2 – Circle the prime number and repeat step one again and again until you end up with all prime numbers.

Example of Factor Tree:

Express 36 as a product of its prime factors.

1st – Write 36 with two lines extending from it as seen on the right.

2nd – Ask yourself, what two factors can give me a product of 36? (start with the lowest prime factor 2)

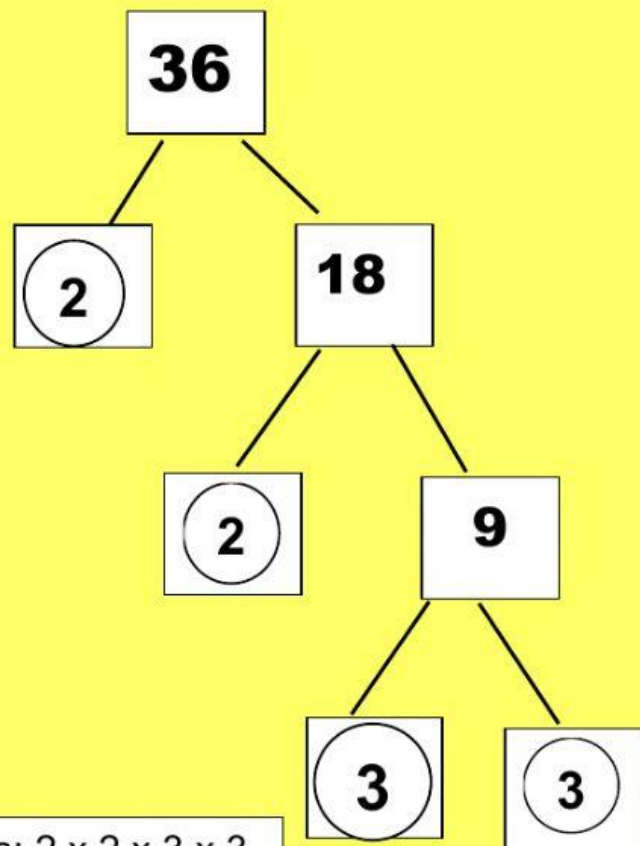
$2 \times 18 = 36$ Write 2 and 18. Circle the prime number 2

3rd – Ask yourself, what two factors can give me a product of 18? (start with the lowest prime factor 2)

$2 \times 9 = 18$ Write 2 and 9. Circle the prime number 2

4th – What two factors gives the product 9.

$3 \times 3 = 9$ Circle the prime numbers.



Factors: $2 \times 2 \times 3 \times 3$

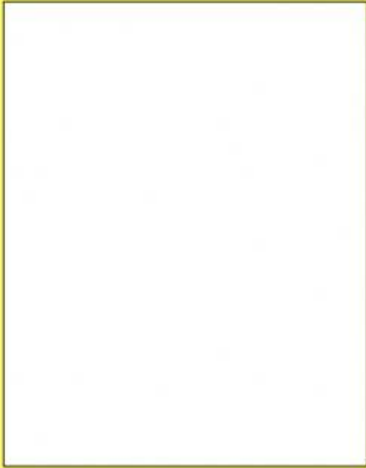
Exponent: $2^2 \times 3^2$

Equals 36

Whole Class

Find the GCF of 24 and 60. Use factor tree or division (factor ladder) to find the prime factors.

Factor Tree



Factor Ladder



Factors:

24 – 

60 –

Common factors – 

Product of the common prime factors – 

The GCF = 

Find the LCM of 8 and 14. Use factor tree or division to find the prime factors.

Factor Tree

Factor Ladder

Factors:

8 –

14 –

Find where each factor appears the most times and mark the factor each time it appears in that set.

The first set has most 2s, the second has most 7s.

Find the product of the marked factors: $2 \times 2 \times 2 \times 7 = 56$

The LCM = 56

Class assignment

Use the Factor Tree or the Division (Factor Ladder) to find the prime factorization for the following:

1. 48

2. 28

3. 8

4. 12

Use prime factors to find the GCF of each pair of numbers.

5. 15 and 20

GCF

6. 12 and 16

GCF

Use prime factorization to find the LCM of 22 and 33

LCM

