

Math III: Do Now

1. The number 6 has exactly 4 different factors: 1, 2, 3, and 6. How many different factors does the number 36 have?
2. How many counting numbers less than 15 have exactly 2 different factors?
3. An even number between 100 and 125 is divisible by 3 and also by 5. What is that number?

(from MOEMS)

Math IV: Do Now

1. In the number 203,500, the last 2 zeroes are called terminal zeros. If the multiplication $30 \times 40 \times 50 \times 60 \times 70$ is done, how many terminal zeroes will the product have?
2. The ages of Amanda, Brittany, and Carly are each prime numbers. Amanda is the youngest. The sum of the ages of Amanda and Brittany is equal to Carly's age. How old is Amanda?
3. How many multiples of 7 are there between 100 and 1000?

From MOEMS

Lesson Objectives

1. To explore whole numbers and their products by:
 - a. Using an area model to represent multiplication
 - b. showing examples that multiplication is commutative
 - c. Finding pairs of factors
 - d. Recognizing that any number has at least 1 and itself as factors
2. To discover how to use factors to sort the counting numbers by:
 - a. Identifying the prime and composite numbers
 - b. Determining the prime factors in a number

A product is

- An answer to a multiplication problem
 - the result of 2 or more factors multiplied
 - Example: $3 \times 4 = 12$ where 12 is the product and 3 and 4 are called factors
- Also true: $12 = 2 \times 6$
 $12 = 4 + 4 + 4$, $12 = 1 \times 12$



An area of a rectangle is calculated by $3 \times 4 = 12$. Since $4 \times 3 = 12$, the order of the factors in a multiplication problem does not matter. Multiplication is **commutative. (changing order does not change result)**

Factors pairs

- A number greater than 1 has at least 2 factors, 1 and itself. To find the factor pairs, start with 1 and continue in numerical order:

- $12 = 1 \times 12$
- $12 = 2 \times 6$
- $12 = 3 \times 4$



Once the factors start to repeat, then stop. You've found the factor pairs.

- There's a special name for a number having only factors of 1 and itself: **Prime**
- **Why is it special? Ex: Prime rib, prime of his life, prime time...**
- Properties of prime: Only 2 factors, no pattern; no formula for finding primes; no limit; real life applications -- computer/security
- Is 1 a prime? Is there a negative prime? Even number primes?

Prime and Composite

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Sieve of Eratosthenes

- To find all of the prime numbers, start by crossing out all that are multiples of 2. Do the same for 3, 5, and so on, until the only numbers left are primes

(see Divisibility Rules from Homework)

A counting number greater than 1 is either prime or composite.

Every composite number is the product of 2 or more prime factors. Example: $16 = 4 \times 4 = 2 \times 2 \times 2 \times 2$ or 2^4 (read 2 to the 4th power)

This is called **Prime Factorization**—the process of factoring a composite number into its prime factors.

Example: $72 = 8 \times 9 = 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$

Your turn: Find the prime factorization of 100.

True or false: A counting number is either prime or composite.

Homework (Due Oct 10)

- Math III

Use Power Point notes to finish pages 17-24, page 29, and page 31.

- Math IV

1) Use PowerPoint notes to finish pages 17-24, page 29, and page 31.

2) Read Divisibility Rules (after page 16) and finish Divisibility Rules Practice Problems

3) SingaporeMath pages 17-22 (including exercises 4 & 5)

GCF and LCM

- Greatest Common Factor (GCF) is the largest factor that is common in 2 or more numbers.
- Example: the GCF of 12 and 20 is 4 since the
- factors of 12 are 1,2,3,4,6,12.
- The factors of 20 are 1,2,4,5,10,20.

You try: find the GCF of 18 and 57.

- Least Common Multiple(LCM) is the smallest multiple that is common in 2 or more number.
- Example: the LCM of 5 and 8 is 40 since the
- Multiples of 4 are 5,10,15,20,25,30,35,40...
- Multiples of 8 are 8,16,24,32,40,48...

You try: find the LCM of 8 and 10.