

# 1. List of Theorems and Definitions

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## 2. Prime numbers

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.

**Theorem 2.2.** *Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.*

**Theorem 2.3** (Euclid). *There are infinitely many primes.*

**Corollary 2.3.1.** *There is no largest prime number.*

**Corollary 2.3.2.** *There are infinitely many composite numbers.*

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**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

**Theorem 2.5.** *There are arbitrarily long stretches of composite numbers.*

*Proof.* For any  $n > 2$ , consider

$$n! + 2, \quad n! + 3, \quad \dots, \quad n! + n.$$



### 3. Appendix (restated or deferred)

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.

**Theorem 2.3** (Euclid). *There are infinitely many primes.*

*Proof.* Suppose to the contrary that  $p_1, p_2, \dots, p_n$  is a finite enumeration of all primes. Set  $P = p_1 p_2 \dots p_n$ . Since  $P + 1$  is not in our list, it cannot be prime. Thus, some prime factor  $p_j$  divides  $P + 1$ . Since  $p_j$  also divides  $P$ , it must divide the difference  $(P + 1) - P = 1$ , a contradiction.  $\square$

**Corollary 2.3.2.** *There are infinitely many composite numbers.*

**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

**Theorem 2.5.** *There are arbitrarily long stretches of composite numbers.*

*Proof.* For any  $n > 2$ , consider

$$n! + 2, \quad n! + 3, \quad \dots, \quad n! + n.$$

$\square$

## 4. Only restate Theorem or Corollary

**Theorem 2.3** (Euclid). *There are infinitely many primes.*

**Corollary 2.3.2.** *There are infinitely many composite numbers.*

**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

**Theorem 2.5.** *There are arbitrarily long stretches of composite numbers.*

## 5. Only restate 'Result'

**Corollary 2.3.2.** *There are infinitely many composite numbers.*

**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

## 6. Only restate (Theorem and ‘Result’) or Definition

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.

**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

## 7. Only restate if some key contains ‘fi’

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.



## 8. Only display if (name is not none) or is 'Result'

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.

**Theorem 2.3** (Euclid). *There are infinitely many primes.*

**Corollary 2.3.2.** *There are infinitely many composite numbers.*

**Theorem 2.4.** *Lorem ipsum dolor sit amet, consectetur adipiscing.*

## 9. Only restate up to <euclid\_proof>

**Definition 2.1** (Prime numbers). A natural number is called a *prime number* if it is greater than 1 and cannot be written as the product of two smaller natural numbers.

**Theorem 2.3** (Euclid). *There are infinitely many primes.*

*Proof.* Suppose to the contrary that  $p_1, p_2, \dots, p_n$  is a finite enumeration of all primes. Set  $P = p_1 p_2 \dots p_n$ . Since  $P + 1$  is not in our list, it cannot be prime. Thus, some prime factor  $p_j$  divides  $P + 1$ . Since  $p_j$  also divides  $P$ , it must divide the difference  $(P + 1) - P = 1$ , a contradiction. □