

Advanced Foundations of Basic Algebra

Algebra · Answer Key · 10 Questions

1. Who is historically credited with introducing the systematic use of the equals sign (=) in 1557 in the book 'The Whetstone of Witte'?

- A) Robert Recorde**
- B) Leonhard Euler
- C) René Descartes
- D) François Viète

2. In the context of the field axioms for real numbers, which property states that $a(b + c) = ab + ac$?

- A) Commutative Property
- B) Associative Property
- C) Distributive Property**
- D) Reflexive Property

3. What is the formal definition of a 'monic' polynomial?

- A) A polynomial with only one term
- B) A polynomial whose highest degree coefficient is 1**
- C) A polynomial with only positive exponents
- D) A polynomial that cannot be factored

4. Which 9th-century mathematician wrote 'Al-Kitab al-mukhtasar fi hisab al-jabr wa'l-muqabala', which provided the etymological origin of the word 'algebra'?

- A) Diophantus of Alexandria
- B) Al-Khwarizmi**
- C) Omar Khayyam
- D) Brahmagupta

5. According to the Fundamental Theorem of Algebra, a non-constant polynomial of degree n with complex coefficients has exactly how many complex roots, counting multiplicity?

- A) $n - 1$ roots
- B) Exactly 1 root
- C) n roots**
- D) An infinite number of roots

6. What is the correct term for a polynomial expression consisting of exactly two terms?

- A) Monomial
- B) Binomial**
- C) Trinomial
- D) Quadrinomial

7. Which property of equality states that if $a = b$, then $a + c = b + c$?

- A) Transitive Property
- B) Symmetric Property
- C) Addition Property of Equality**
- D) Substitution Property

8. In algebra, what is the 'discriminant' of a quadratic equation $ax^2 + bx + c = 0$ used to determine?

- A) The value of x
- B) The number and type of roots**
- C) The vertex coordinates
- D) The line of symmetry

9. What is the additive identity element in the set of real numbers?

- A) 1
- B) Infinity
- C) -1
- D) 0**

10. Which mathematician is often referred to as the 'Father of Algebra' for his work 'Arithmetica', which dealt with solving algebraic equations?

- A) Euclid
- B) Diophantus**
- C) Pythagoras
- D) Archimedes