

History of Mathematical Ideas Quiz 8

Name: _____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. 1. Let $\mathbb{C} = \langle \{\text{complex numbers}\}; +, -, 0, \cdot, 1 \rangle$ be the field of complex numbers. An *automorphism* of \mathbb{C} is defined to be a bijection $\alpha: \mathbb{C} \rightarrow \mathbb{C}$ that satisfies some properties. Write down one of the properties that is part of the definition of ‘automorphism’.

Any one of the following properties is a correct answer:

- (a) $\alpha(x + y) = \alpha(x) + \alpha(y)$.
- (b) $\alpha(-x) = -\alpha(x)$.
- (c) $\alpha(0) = 0$.
- (d) $\alpha(x \cdot y) = \alpha(x) \cdot \alpha(y)$.
- (e) $\alpha(1) = 1$.

2. Recall that a projective plane is a structure of the form $\langle \mathcal{P}, \mathcal{L}; I \rangle$ where (i) \mathcal{P} and \mathcal{L} are sets, (ii) $I \subseteq \mathcal{P} \times \mathcal{L}$ is a binary relation from \mathcal{P} to \mathcal{L} , and (iii) some axioms hold. Write down one of the axioms of projective geometry.

Any one of the following axioms is a correct answer:

- (a) Any two distinct points determine a unique line.
- (b) Any two distinct lines determine a unique point.
- (c) There is a 4-point.