

Quiz 1

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. Who or what was Ozymandias?

2. What was happening in the world in the decades after 1770?

3. Define the cartesian product of two sets.

4. Explain how an equivalence relation determines a partition, and conversely.

5. True or false: if $A \subset B$ and $|A| = |B|$ then $A = B$. Explain!

Quiz 2

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. What are the “earliest theorems”? Who proved them?

2. What is the definition of an isometry? What is the definition of congruence?

3. How do our ideas about congruence “practically force” us to the group axioms? Be precise!

4. What is a subgroup of a group?

5. Prove that functional composition is associative.

Quiz 3

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. In what ways does our modern treatment of the concept of distance in the plane differ from that of Euclid and his contemporaries?

2. Describe the Isometry Theorem in plain English, as succinctly and precisely as possible.

3. What is an eigenvector?

4. What is the characteristic polynomial?

5. Why is a glide reflection not a reflection?

Quiz 4

Read each question carefully. Use complete sentences. Above all, *be neat!*

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1. Explain why the total number of permutations of $\{1, \dots, n\}$ is $n!$.

 2. Describe Chapter 3's permutation notation in plain English. Give examples.

 3. What are the five Platonic Solids? Why are they called that?

 4. What is Descartes formula for a polyhedron? In brief, how is it proved?

 5. What exactly was Felix Klein's "Erlanger Programm"?

Quiz 5

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. How does the Islamic world of the 6th to 12th centuries compare to Europe of the 15th to 19th centuries, socially, politically, and mathematically?

2. Why do students need to understand the cancellation property? How would you show them its importance?

3. What role did elliptic curves play in Wiles' proof of Fermat's Last Theorem?

4. Show by example that sometimes it is hard to tell whether a number is real.

5. What is Diophantos' "chord and tangent method" used for? Be precise! Explain the method, in words and pictures.

Quiz 6

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. Can we expect that $\sqrt{a \cdot b}$ equals $\sqrt{a} \cdot \sqrt{b}$ in the complex numbers?

2. What kinds of discrimination did De Moivre suffer from?

3. Show that every quadratic with complex coefficients has a root.

4. What is the Spectral Theorem?

5. What is a ring?

Quiz 7

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. Doesn't Descartes' Factor Theorem say that a polynomial $p(x)$ is irreducible if and only if $p(x) = 0$ does not have a root? Explain!

2. Express the discriminant δ^2 in terms of elementary symmetric functions when $n = 2$.

3. Who the heck was de Foncenex?

4. Explain why no proof of the Fundamental Theorem of Algebra is purely algebraic.

5. What did Lagrange mean by a "value" of a function?

Quiz 8

Read each question carefully. Use complete sentences. Above all, *be neat!*

1. True or false: Distinct orbits are disjoint. Explain!

2. What are the relative advantages and disadvantages of Cauchy's cycle notation, in comparison to our earlier permutation notation?

3. How is the second version of Lagrange's Theorem a generalization of the first version? Be precise!

4. Are there significant gender differences in the suite of cognitive abilities? Are these significant enough to warrant different approaches to teaching science and mathematics?

5. Do you believe that gender segregation in education is more of a force for lessening gender bias in the workplace or increasing it?