

Journey Through Genius - Chapter 1 - Reading Check

1. How do we know the Babylonians were aware of some version of the Pythagorean Theorem?

The Plimpton-322 , p. 5

1. Roughly how old is the Plimpton-322 tablet?

1800 BC

1. Consider Thales, Pythagoras and Hippocrates. Where and when did they live?

Thales (600 BC - Miletus - Asia Minor) Pythagoras (572 BC - Samos / Asia Minor / Eastern Greece)
Hippocrates (440 BC - Chio - Asia Minor)

1. Order the following sets of numbers: Real, constructible, transcendental, algebraic.

constructible < algebraic < transcendental < real

1. How many lunes are quadrable?

5

1. What great ancient civilization used a base 60 number system?

Babylonians

1. What is our first great theorem and to whom do we attribute the proof?

Hippocrates of Chios - His lune, on a square inscribed inside a circle is quadrable.

1. To what ancient civilization do we celebrate for the way they used the simple and elementary as a foundation for the complex and intricate?

Greek

1. Why do you think the Greeks regarded quadrature so highly?

It represented the triumph of reason and reflected the inherent simplicity in nature.

1. Give a rough argument that the circle cannot be squared.

The number is not algebraic, therefore it cannot be constructible. If the circle could be squared, then we could construct a square with area π , and thus an edge of length $\sqrt{\pi}$, implying that π is constructible.

Chapter 2

- ▼1. What is our 2nd great theorem? Give a description in words and pictures of the proof.
- a. Euclid's proof of the Pythagorean Theorem.
2. Does the Pythagorean Theorem depend on Euclid's Parallel Postulate, i.e., is it true in non-Euclidean Geometry?
- ▼3. Is the Euclidean parallel postulate (number 5) assumed in the proof that the sum of the interior angles of a triangle equals two right angles? What does this suggest?
- a. Yes. In an alternate geometry without this assumption, interior angles don't have to sum to 180
- ▼4. Who proved that Euclid's postulate five (the parallel postulate) cannot be proved from postulates I-IV?
- a. Bolyai, Riemann, Lobachevski, Gauss, independently did work - It was Beltrami who prove consistency.
- ▼5. State a theorem that is true in non-Euclidean geometry that is not true in Euclidean geometry.
- a. AAA triangle congruence