

History of Mathematical Ideas

Quiz 5

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. What is meant by a *constructible real number*?

A constructible real number is a point on the X -axis that is constructible from O and I by straightedge and compass.

(The above definition relies on the definition of “constructible point”, which is recursively defined as follows:

- (1) O and I are constructible.
- (2) If two points are constructible, then the line through them is constructible.
- (3) If two points are constructible, then the circle through one that passes through the other is constructible.
- (4) If two lines, two circles, or a line and a circle are constructible, then the points of intersection are constructible.)

2. Given a positive length x , describe how to construct \sqrt{x} using straightedge and compass.

Mark a point on the positive X -axis at a distance x from the origin. Mark a point on the negative X -axis at a distance -1 from the origin. Bisect the segment given by these two points, and use it as the center of a circle whose diameter is defined by the two marked points. This circle crosses the Y -axis at a point whose distance from the origin is \sqrt{x} .