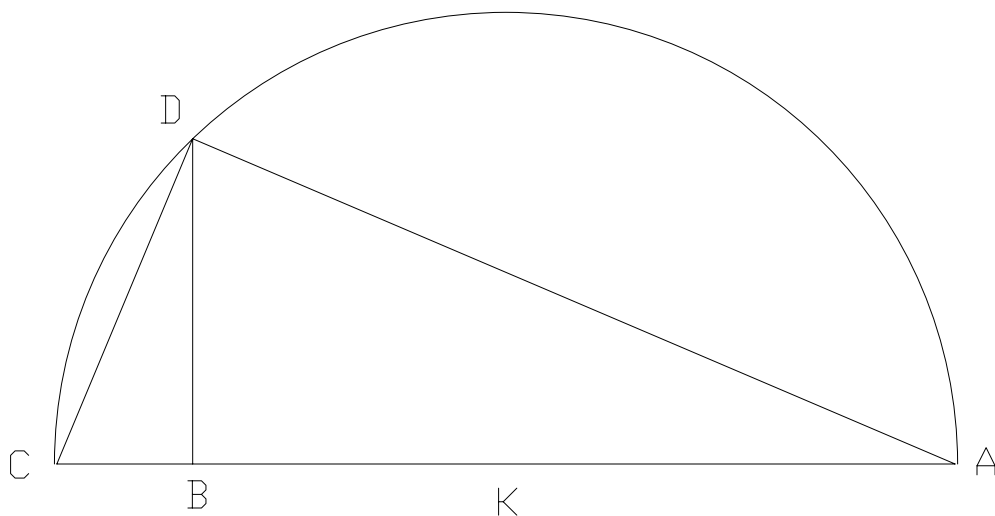


This from Rene Descaartes' Book I:  
 Required to construct a line whose  
 length is the square root of a given  
 line. The given line is AB below and he  
 proceeds by extending it one unit to C,  
 thus establishing a scale which one must  
 have to treat line lengths as numbers. He  
 draws a semicircle with AC as a diameter and  
 erects a perpendicular at B, intersecting the  
 circle at D. DB has the required length.

Descartes' proof as translated by Hawking  
 has steps similar to those listed below.



Triangles CBD, ABD, and CDA are all right triangles  
 (CDA because it's inscribed in a semicircle)

CBD is similar to CDA (they share an angle at C) and  
 DBA is similar to CDA (they share an angle at A) so  
 CBD and DBA are similar. Therefore:

$AB/DB = DB/CB$  (Corresponding sides are proportional)

But  $CB = 1$  so

AB equals the square of DB, that is, DB is the  
 required square root of AB.