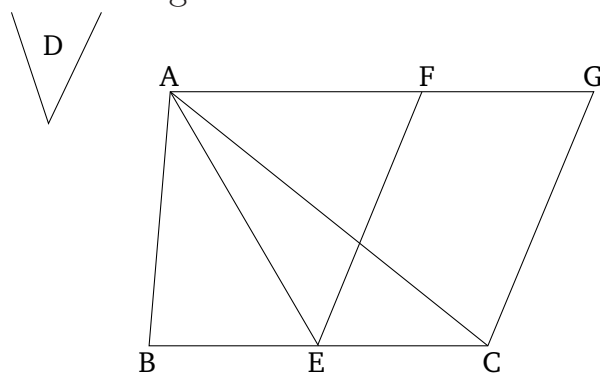


Book 1

Proposition 42

To construct a parallelogram equal to a given triangle in a given rectilinear angle.

Let ABC be the given triangle, and D the given rectilinear angle. So it is required to construct a parallelogram equal to triangle ABC in the rectilinear angle D .



Let BC have been cut in half at E [Prop. 1.10], and let AE have been joined. And let (angle) CEF , equal to angle D , have been constructed at the point E on the straight-line EC [Prop. 1.23]. And let AG have been drawn through A parallel to EC [Prop. 1.31], and let CG have been drawn through C parallel to EF [Prop. 1.31]. Thus, $FECD$ is a parallelogram. And since BE is equal to EC , triangle ABE is also equal to triangle AEC . For they are on the equal bases, BE and EC , and between the same parallels, BC and AG [Prop. 1.38]. Thus, triangle ABC is double (the area) of triangle AEC . And parallelogram $FECD$ is also double (the area) of triangle AEC . For it has the same base as (AEC), and is between the same parallels as (AEC) [Prop. 1.41]. Thus, paral-

lelogram $FECG$ is equal to triangle ABC . ($FECG$) also has the angle CEF equal to the given (angle) D .

Thus, parallelogram $FECG$, equal to the given triangle ABC , has been constructed in the angle CEF , which is equal to D . (Which is) the very thing it was required to do.