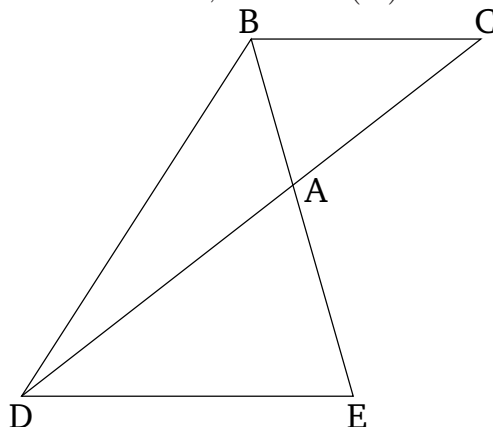# Book 6
Proposition 15

In equal triangles also having one angle equal to one (angle) the sides about the equal angles are reciprocally proportional. And those triangles having one angle equal to one angle for which the sides about the equal angles (are) reciprocally proportional are equal.

Let ABC and ADE be equal triangles having one angle equal to one (angle), (namely) BAC (equal) to DAE. I say that, in triangles ABC and ADE, the sides about the equal angles are reciprocally proportional, that is to say, that as CA is to AD, so EA (is) to AB.

For let CA be laid down so as to be straight-on (with respect) to AD. Thus, EA is also straight-on (with respect) to AB [Prop. 1.14]. And let BD have been joined.

Therefore, since triangle ABC is equal to triangle ADE, and BAD (is) some other (triangle), thus as triangle CAB is to triangle BAD, so triangle EAD (is) to triangle BAD [Prop. 5.7]. But, as (triangle) CAB (is) to

BAD, so CA (is) to AD, and as (triangle) EAD (is) to BAD, so EA (is) to AB [Prop. 6.1]. And thus, as CA (is) to AD, so EA (is) to AB. Thus, in triangles ABC and ADE the sides about the equal angles (are) reciprocally proportional.

And so, let the sides of triangles ABC and ADE be reciprocally proportional, and (thus) let CA be to AD, as EA (is) to AB. I say that triangle ABC is equal to triangle ADE.

For, BD again being joined, since as CA is to AD, so EA (is) to AB, but as CA (is) to AD, so triangle ABC (is) to triangle BAD, and as EA (is) to AB, so triangle EAD (is) to triangle BAD [Prop. 6.1], thus as triangle ABC (is) to triangle BAD, so triangle EAD (is) to triangle BAD. Thus, (triangles) ABC and EAD each have the same ratio to BAD. Thus, [triangle] ABC is equal to triangle EAD [Prop. 5.9].

Thus, in equal triangles also having one angle equal to one (angle) the sides about the equal angles (are) reciprocally proportional. And those triangles having one angle equal to one angle for which the sides about the equal angles (are) reciprocally proportional are equal. (Which is) the very thing it was required to show.