

Euclid's Isosceles Proposition

Euclid's Isosceles postulate described that the base angles of an isosceles triangle are equal.

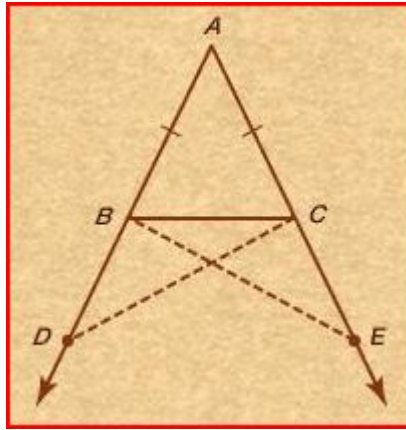


Figure 1:

Proof:

1. We are given that $\triangle ABC$ is an isosceles triangle and therefore, $AB = AC$.
2. Extending AB and AC indefinitely, we put a points, D and E, on each ray, equal distances apart from B and C. Therefore, $AD = AE$.
3. $\angle DAC = \angle EAB$ because they are the same angle.
4. Therefore, $\triangle DAC \cong \triangle EAB$ by side-angle-side.
5. That will also make $\angle ADC = \angle AEB$ and makes $DC = EB$ by side-angle-side.
6. Since $BD = AD - AB$, $CE = AE - AC$, $AB = AC$, and $AD = AE$. So $BD = CE$ all by construction of Figure 1.

7. By the side-angle-side theorem, $\triangle BDC \cong \triangle CEB$.
8. Therefore, $\angle DBC = \angle ECB$.
9. Since, $\angle ABC = \deg 180 - \angle DBC$, and $\angle ACB = \deg 180 - \angle ECB$. Then, $\angle ABC = \angle ACB$.