

# MT 453 Elements Day 8

Speaker: Kaitlyn Valente

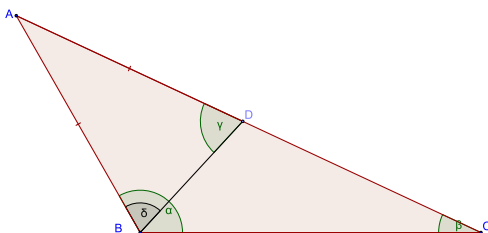
Scribe: Vincent Embser

Artist: Sean Johnson

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## Proposition I.18

*The greater side in a triangle is opposite the greater angle.*



Let  $ABC$  be the given triangle with side  $AC$  greater than side  $AB$ .

Claim:  $\alpha > \beta$

Cut  $AC$  at  $D$  so that  $AD = AB$ . (Prop. I.5)

Draw  $BD$ . (Post 1)

Since  $\gamma$  is an exterior angle of  $\triangle BCD$ ,  $\gamma > \beta$ . (Prop I.16).

$\gamma = \delta$  because  $\triangle BAD$  is isosceles. (Prop. I.5).

So  $\delta > \beta$

But  $\delta$  is part of  $\alpha$ , so  $\alpha > \delta$ , because the whole is greater than the part. (C.N.5)

So  $\alpha$  is much greater than  $\beta$ .

Q.E.D.