

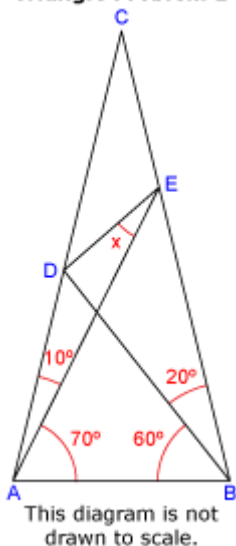
## Problema 661

Sea ABC un triángulo tal que

- 1) D esté sobre el lado AC tal que  $\angle DBA = 60^\circ$ ,  $\angle CBD = 20^\circ$
- 2) E esté sobre el lado BC tal que  $\angle EAB = 70^\circ$ ,  $\angle CAE = 10^\circ$ .

Hallar la medida del ángulo DEA.

Triangle Problem 1



<http://thinkzone.wlonk.com/MathFun/Triangle.htm>

página de [Keith Enevoldsen](#), ingeniero informático de Boeing.



thinkzone.wlonk.com

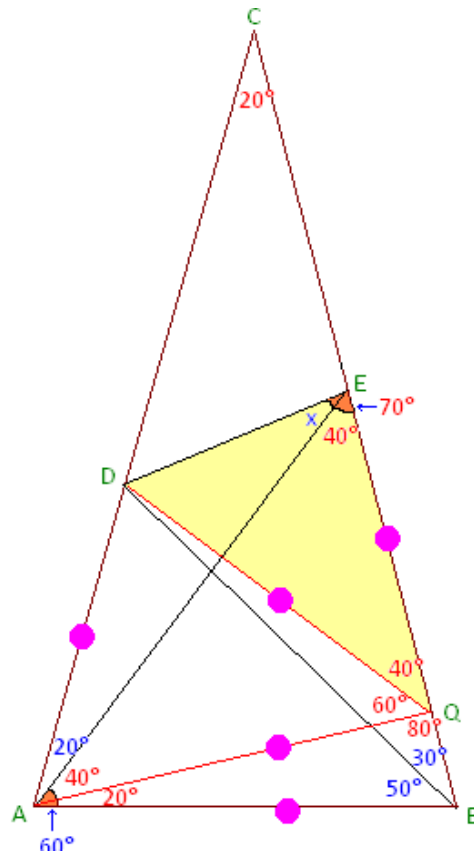
Two problem of

Using only elementary geometry, determine angle x. Provide a step-by-step proof.

This is a variation of the problem above. This is also a very hard problem that is, in a sense, easy.

Here is a [very small hint](#). Here is a [small hint](#). These hints are not spoilers.

A geometric diagram showing a triangle  $ABC$  with interior points  $D$  and  $E$ . Lines  $AD$ ,  $BE$ , and  $CE$  are drawn. The angles are labeled as follows:  $\angle DAB = 20^\circ$ ,  $\angle DBA = 60^\circ$ ,  $\angle EBC = 30^\circ$ , and  $\angle ECB = 50^\circ$ . The angle between  $AD$  and  $BE$  is labeled  $x$ .

$$\vdots$$


El triángulo AEQ también es isósceles ( $AQ = EQ$ ).

El Triángulo ADC es isósceles ( $AD = AB$ ).

Unamos D con Q, se demuestra que el triángulo ADQ es equilátero ( $AD = AQ = DQ$ ), luego  $m\angle DQA = 60^\circ$ .

De todo esto se deduce que :  $EQ = AQ = AB = AD = DQ$ .

Finalmente el triángulo DQE es isósceles ( $DQ = EQ$ ),  $m\angle DQE = 40^\circ$ , por lo tanto  $m\angle DEQ = 70^\circ$ , de la figura :  $x + 40^\circ = 70^\circ$  luego

**$x = 30^\circ$**