



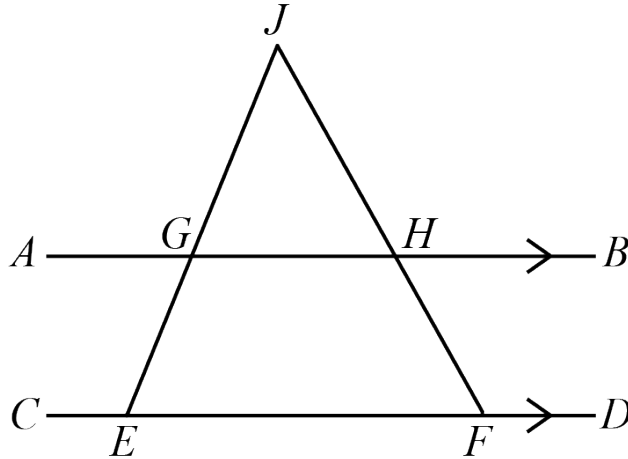
Problem of the Week

Problem C and Solution

Angled

Problem

Line segments AB and CD are parallel, with AB above CD . Point J lies above AB , and points E and F lie on CD , with E to the left of F , so that JE intersects AB at G and JF intersects AB at H .



If $\angle CEG = 110^\circ$ and $\angle GHF = 122^\circ$, determine the measure of $\angle GJH$.

Solution

Solution 1

Since JHF is a straight line, then $\angle JHG = 180^\circ - \angle GHF = 180^\circ - 122^\circ = 58^\circ$. Since AB and CD are parallel, $\angle AGJ = \angle CEG = 110^\circ$. Since AGH is a straight line, $\angle JGH = 180^\circ - \angle AGJ = 180^\circ - 110^\circ = 70^\circ$. Since the three angles in a triangle add to 180° , then

$$\angle GJH = 180^\circ - \angle JGH - \angle JHG = 180^\circ - 70^\circ - 58^\circ = 52^\circ.$$

Solution 2

Since JHF is a straight line, then $\angle JHG = 180^\circ - \angle GHF = 180^\circ - 122^\circ = 58^\circ$. Since AB and CD are parallel, $\angle JFE = \angle JHG = 58^\circ$. Since CEF is a straight line, $\angle JEF = 180^\circ - \angle CEG = 180^\circ - 110^\circ = 70^\circ$. Since the three angles in a triangle add to 180° , then

$$\angle GJH = \angle EJF = 180^\circ - \angle JEF - \angle JFE = 180^\circ - 70^\circ - 58^\circ = 52^\circ.$$

NOTE: Since $\triangle GJH$ and $\triangle EJF$ have all three angles in common, we can say that they are *similar triangles*. Similar triangles have properties that make them very useful in geometry problems.