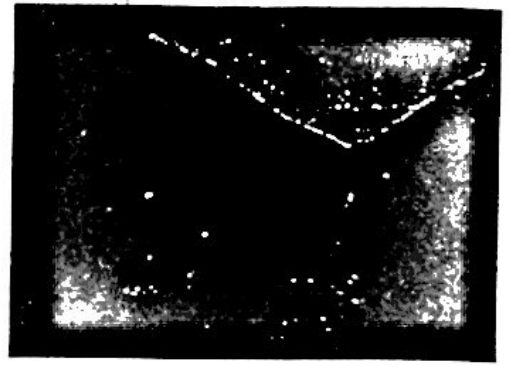


(1)

(b) An engineer is working in mountainous terrain. She needs to know the distance between two locations E and F which are inaccessible across a deep gorge (see diagram below). She finds two locations C and D on her side of the gorge which are on the same level such that



$|CD| = 20$  metres.

*Clinometer*

Using a ~~theodolite~~ *clinometer*, she finds the measure of four angles as follows:

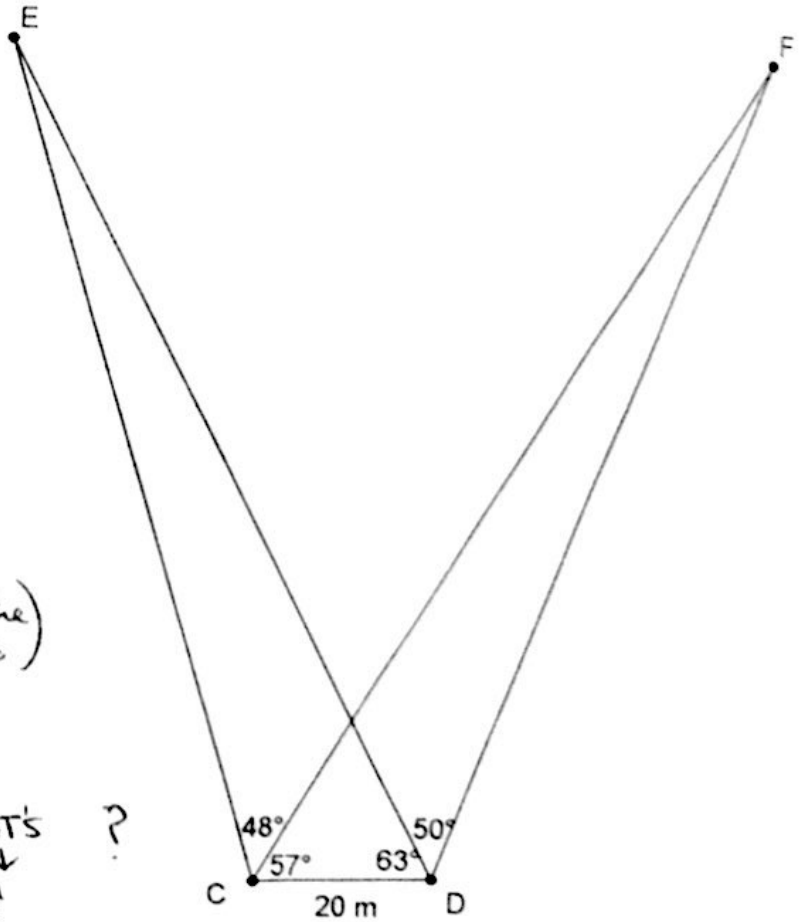
$\angle ECF = 48^\circ$

$\angle FCD = 57^\circ$

$\angle CDE = 63^\circ$

$\angle EDF = 50^\circ$

Use this information to find  $|EF|$ , showing all your work clearly.

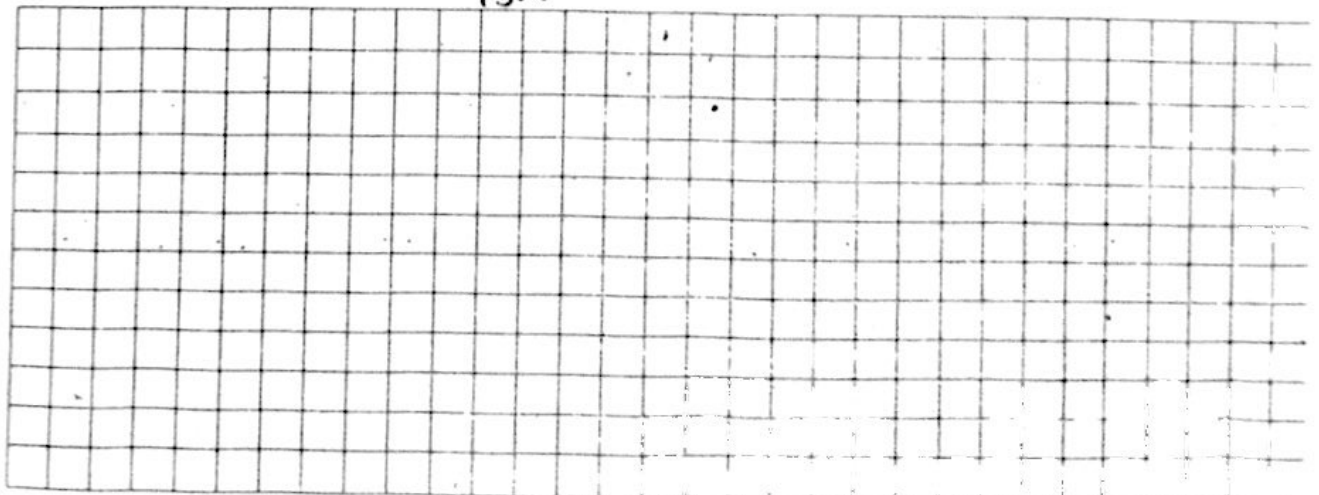


Hint: • look at the sketch (not the photo)

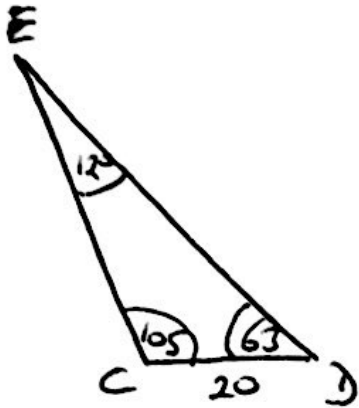
• it's just a load of  $\Delta$ 's

• Sine Rule / cosine Rule / RAT'S ?

↓  
sin  
cos  
tan  
Pyth

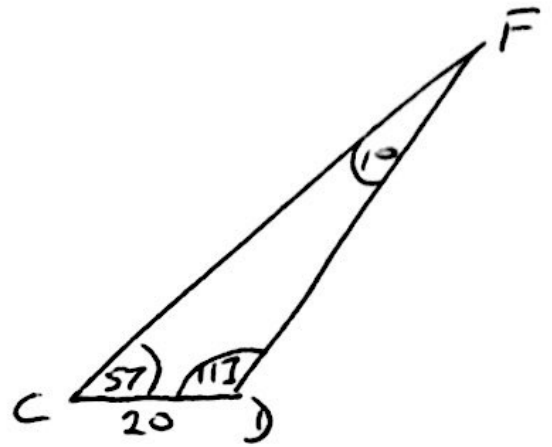


# TRIG ① SOLN



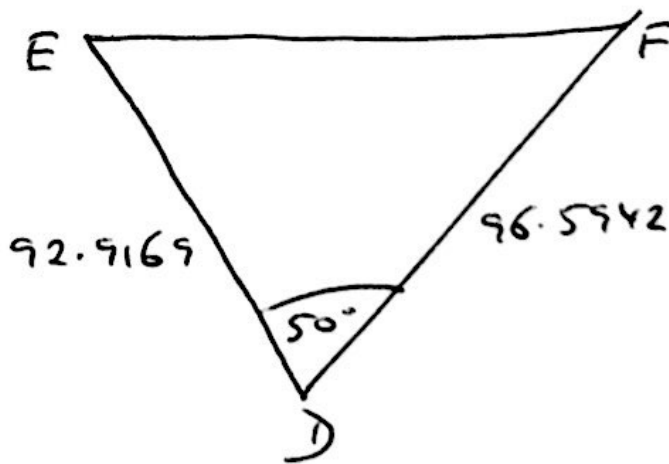
$$\frac{|ED|}{\sin 105^\circ} = \frac{20}{\sin 12^\circ}$$

$$\therefore |ED| = 92.9169$$



$$\frac{|FD|}{\sin 57^\circ} = \frac{20}{\sin 10^\circ}$$

$$|FD| = 96.5942$$



$$|EF|^2 = (92.9169)^2 + (96.5942)^2 - 2(92.9169)(96.5942)\cos 50^\circ$$

$$|EF| = 80.16 \text{ m}$$