homework #3 problem 11

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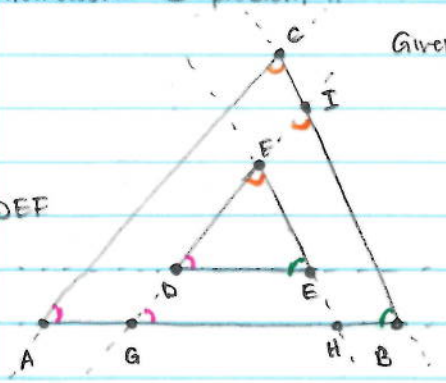

Given: DE // AB, DF // AC, EF // BC

Prove: $\triangle ABC \sim \triangle DEF$

① BF 9, extend DE, AB, EF, BC, DF, AC to infinite lines

② intersection DF w/ AB = G
FE w/ AB = H
DF w/ BC = I

③ DE // AB, $\measuredangle FDE = \measuredangle DGH$ by BFS

④ DF // AC, parallel lines DE and AB cross it, $\measuredangle CAB = \measuredangle DGH$ by BFS

⑤ $\measuredangle FDE = \measuredangle CAB$ by substitution

⑥ AC // DF, $\measuredangle ACB = \measuredangle FIB$ by BFS (CB = transversal).

⑦ FE // BC, parallel lines DF and AC cross it, $\measuredangle DFE = \measuredangle FIB$ by BFS

⑧ $\measuredangle ACB = \measuredangle DFE$. by substitution

⑨ Because $\measuredangle ACB = \measuredangle DFE$, $\measuredangle FDE = \measuredangle CAB$, Theorem 4 tells us $\measuredangle ABC = \measuredangle DEF$

⑩ Definition of similar triangles, $\triangle ABC \sim \triangle DEF$.