

Geometry Homework Week 6

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1 Problems

1. Let ABC be a triangle, and draw isosceles triangles BCD, CAE, ABF externally to ABC , with BC, CA, AB as their respective bases. Prove that the lines through A, B, C perpendicular to the lines $\overleftrightarrow{EF}, \overleftrightarrow{FD}, \overleftrightarrow{DE}$, respectively, are concurrent.
2. Let H be the orthocenter of an acute-angled triangle ABC . The circle Γ_A centered at the midpoint of BC and passing through H intersects line BC at points A_1 and A_2 . Similarly, define the points B_1, B_2, C_1 and C_2 .

Prove that six points A_1, A_2, B_1, B_2, C_1 and C_2 are concyclic.