To inscribe an equilateral and equiangular hexagon in a given circle.

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Given a circle, construct its center O by III.1, then draw the diameter AB. Construct the circle centered at A with radius AO. Label the intersections of these two circles as C and D. Draw the diameters CE and DF. Join AC, CF, FB, BE, ED and DA.

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As angle COA equals angle AOD, by I.13, angles FOC, COA, and AOD are equal to one another.

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As angle COA equals angle AOD, by I.13, angles FOC, COA, and AOD are equal to one another. Therefore, by vertical angles, angles FOC, COA, AOD, DOE, EOB, and BOF are equal. By SAS, it follows that triangles FOC, COA, AOD, DOE, EOB and BOF are congruent. Thus, sides AC, CF, FB, BE, ED and DA equal one another, and angles DAC, ACF, CFB, FBE, BED and EDA equal one another.

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As angle COA equals angle AOD, by I.13, angles FOC, COA, and AOD are equal to one another. Therefore, by vertical angles, angles FOC, COA, AOD, DOE, EOB, and BOF are equal. By SAS, it follows that triangles FOC, COA, AOD, DOE, EOB and BOF are congruent. Thus, sides AC, CF, FB, BE, ED and DA equal one another, and angles DAC, ACF, CFB, FBE, BED and EDA equal one another. Consequently, we have inscribed an equilateral and equiangular hexagon in a given circle.