

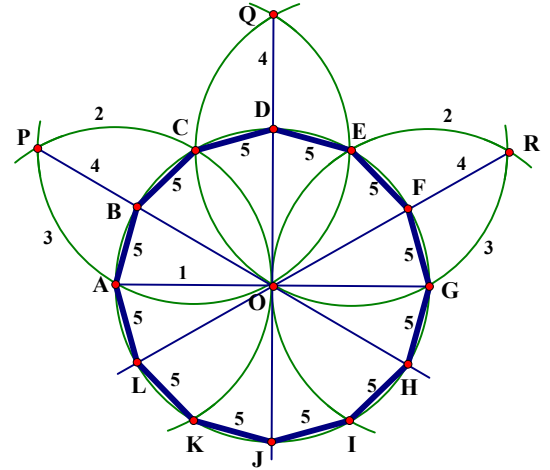
## Construct a regular dodecagon inscribed in a circle.

Created by Mr. Francis Hung on 20220623. Last updated: 03/07/2023

Given a circle with centre at  $O$ . To construct a regular dodecagon (regular 12-sided polygon) inscribed in the circle.

Construction steps:

- (1) Construct the diameter  $AOG$ .
- (2) Draw an arc  $\odot(A, AO)$ , cutting the circle at  $C$  and  $K$  as shown.  
Draw an arc  $\odot(G, GO)$ , cutting the circle at  $E$  and  $I$  as shown.
- (3) Draw an arc  $\odot(C, CO)$ , cutting the arc  $\odot(A, AO)$  at  $P$ .  
Draw an arc  $\odot(E, EO)$ , cutting the arc  $\odot(G, GO)$  at  $R$ .  
The two arcs  $\odot(C, CO)$  and  $\odot(E, EO)$  intersect at  $Q$  and  $O$ .



- (4) Join  $PO$  and produce to cut the circle again at  $H$ .  
Join  $QO$  and produce to cut the circle again at  $J$ .  
Join  $RO$  and produce to cut the circle again at  $L$ .
- (5) Join  $AB, BC, CD, DE, EF, FG, GH, HI, IJ, JK, KL$  and  $LA$ .

Then  $ABCDEFGHIJKL$  is the required regular dodecagon. Proof omitted.

Using a similar method, we can construct a regular 24-sided polygon, regular 48-sided polygon,.....

, regular  $3 \times 2^n$ -gon ( $n \geq 1$ ) inscribed in a circle.