

## Creating a Square in GeoGebra

1. Imagine you are designing a square garden in the middle of a circular courtyard. The courtyard is surrounded by a fence, and you want to maximize the area of the garden while keeping it square. The circular courtyard has a radius of 30 meters. What is the largest length you can make the sides of the square garden?

Use GeoGebra to construct the circle and the square

2. Suppose you are a farmer who needs to fence off a circular pasture for your cows. The pasture must have a radius of 100 meters, but you want to maximize the grazing area for your cows by placing a square feeding trough inside the pasture. The trough must be positioned so that all four corners touch the edge of the pasture what is the largest possible area you can make this square feeding trough, and what are its dimensions?

# How to construct a square inside a circle in GeoGebra



Step 1: Construct a circle with center A through B. (circle c)



Step 2: Construct line AB. (line g)



Step 3: Construct the intersection points between line g and circle c. (points C & D)



Step 4: Construct a circle with the center at point C and radius of  $r \pm 0.5$ . (circle d)



Step 5: Use the compass toll to copy circle d and place it on point D. (circle e)



Step 6: Construct the intersection points between circles d & e. (points F & G)



Step 7: Construct line  $FG$ . (line h)



Step 8: Construct the intersection points between line h and circle c. (points H & I)

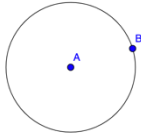


Step 9: Draw Quadrilateral HCID. (poly1)

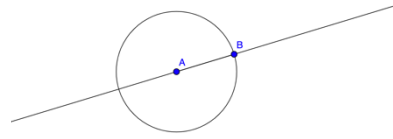
# How to construct a square inside a circle in Geogebra



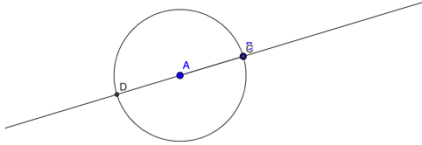
Step 1: Construct a circle with center A through B. (circle c)



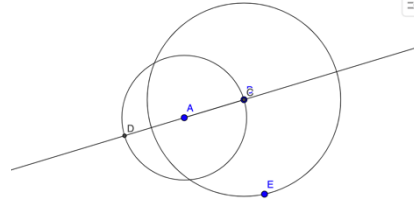
Step 2: Construct line AB. (line g)



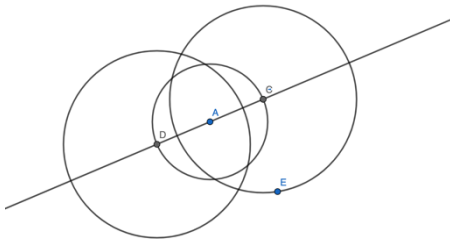
Step 3: Construct the intersection points between line g and circle c. (points C & D)



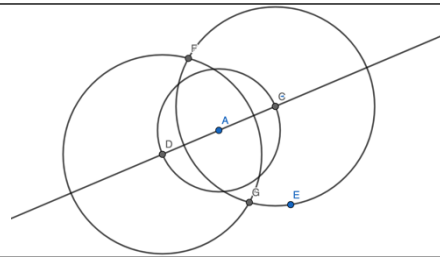
Step 4: Construct a circle with the center at point C and radius of f+.5. (circle d)



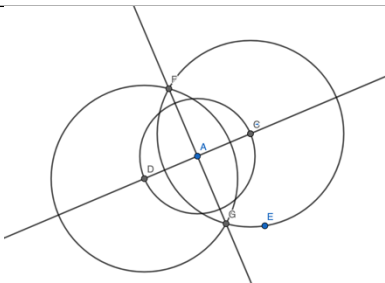
Step 5: Use the compass toll to copy circle d and place it on point D. (circle e)



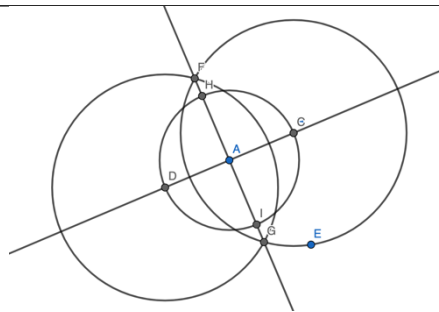
Step 6: Construct the intersection points between circles d & e. (points F & G)



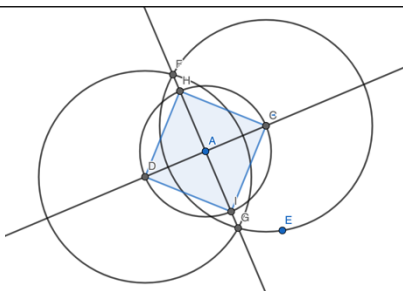
Step 7: Construct line FG. (line h)



Step 8: Construct the intersection points between line h and circle c. (points H & I)



Step 9: Draw Quadrilateral HCID. (poly1)



Extra Practice:

1. Using GeoGebra, find the length of the sides of the largest square possible to fit inside of a circle with a radius of 8.
2. Using GeoGebra, find the length of the sides of the largest square possible to fit inside of a circle with a radius of 20.
3. Using GeoGebra, find the length of the sides of the largest square possible to fit inside of a circle with a radius of 300.
4. A company wants to place a square logo on a circular background for their product packaging. The diameter of the circle background is 10 centimeters. What is the maximum side length of the square logo that can fit the circular background perfectly?
5. Create a math problem that requires you to create a square inside of a circle.