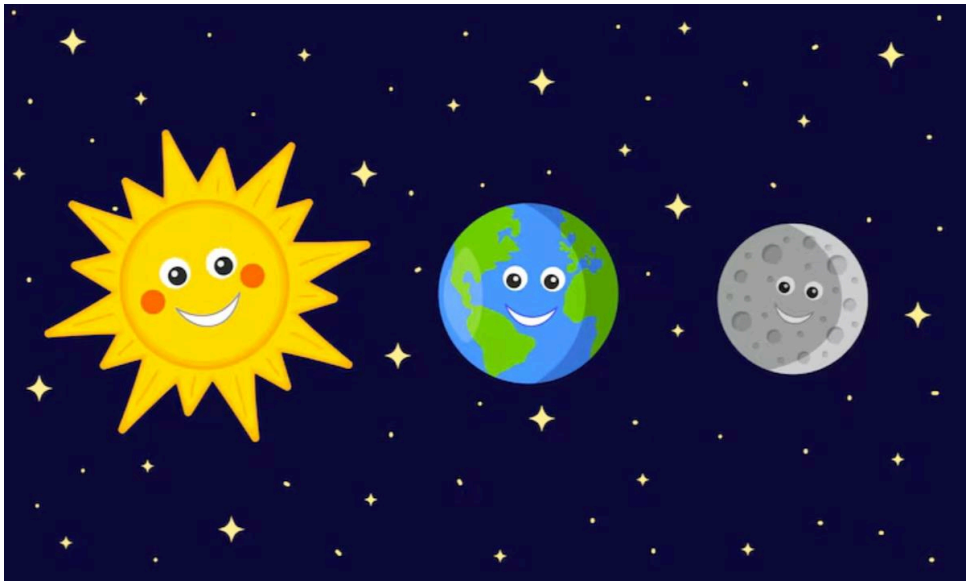
Construct Arc of Large Radius Circle

A circle can be defined as the locus of all points in a plane that are a fixed distance, called the *radius*, from a fixed point, called the *center*.

Whatif center of circle are not available to construct arc of circle, for example if we draw sketch of earth with radius 5 inches , then comparable radius of sun come out to be ≈ 546 inches ≈ 13.87 m (which is hard to construct on a limited area like a wall, so we draw an arc to represent the circle)



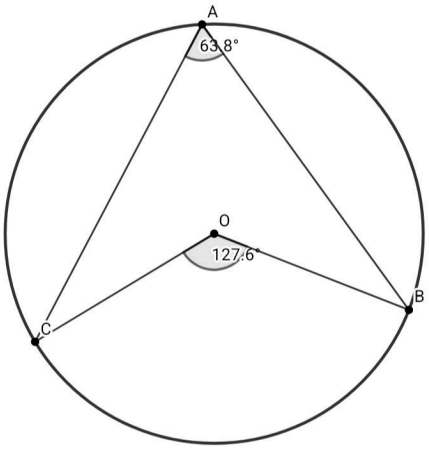
PROBLEM : Drawing an arc of Circle having a large radius without using its center between two points.

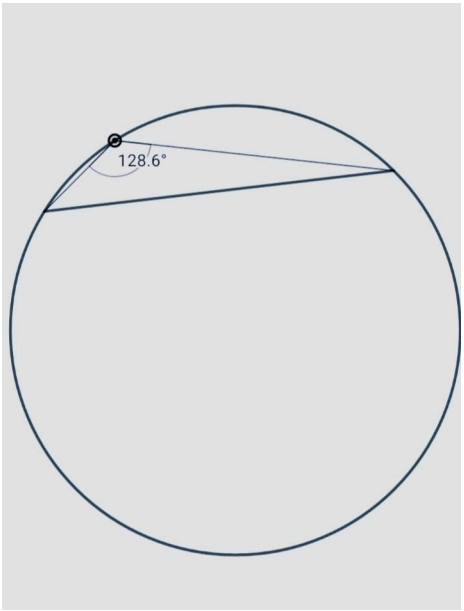
SOLUTION :

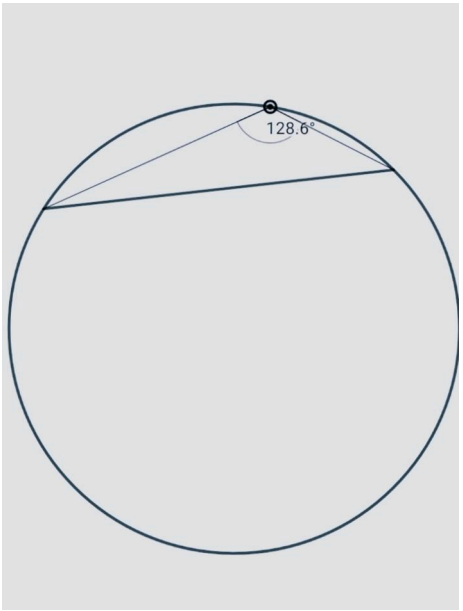
<u>Requirement:</u>

The *Inscribed Angle Theorem* states that an inscribed angle in a circle is half the measure of the intercepted arc.

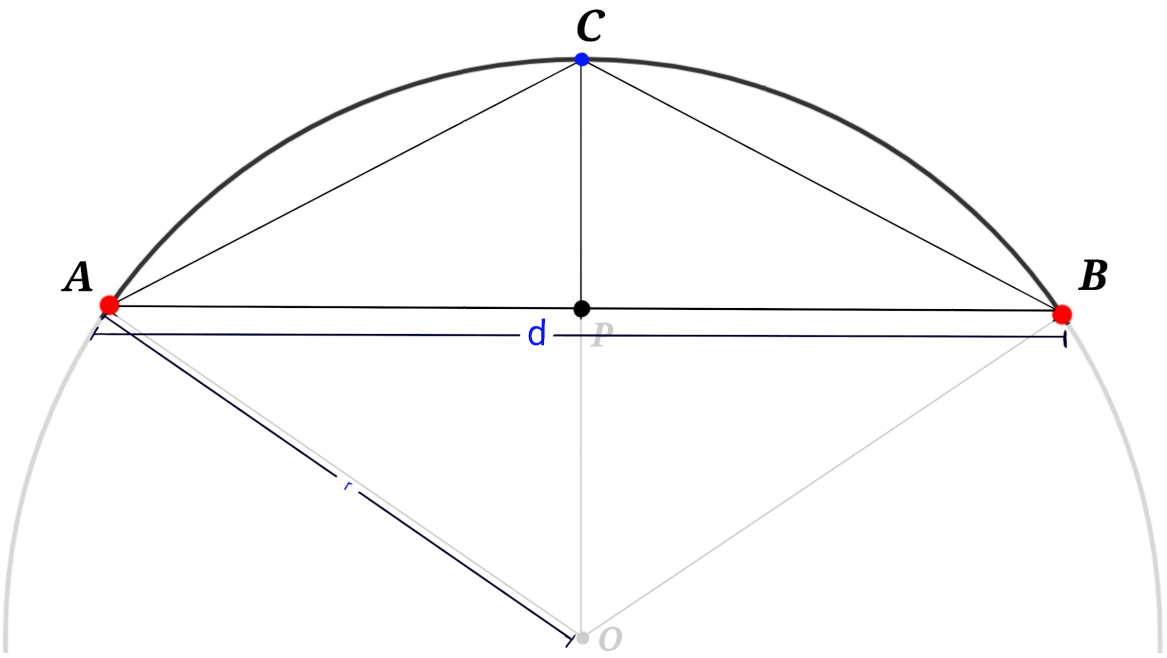
Corollary : The inscribed angles subtended by the same arc are equal.

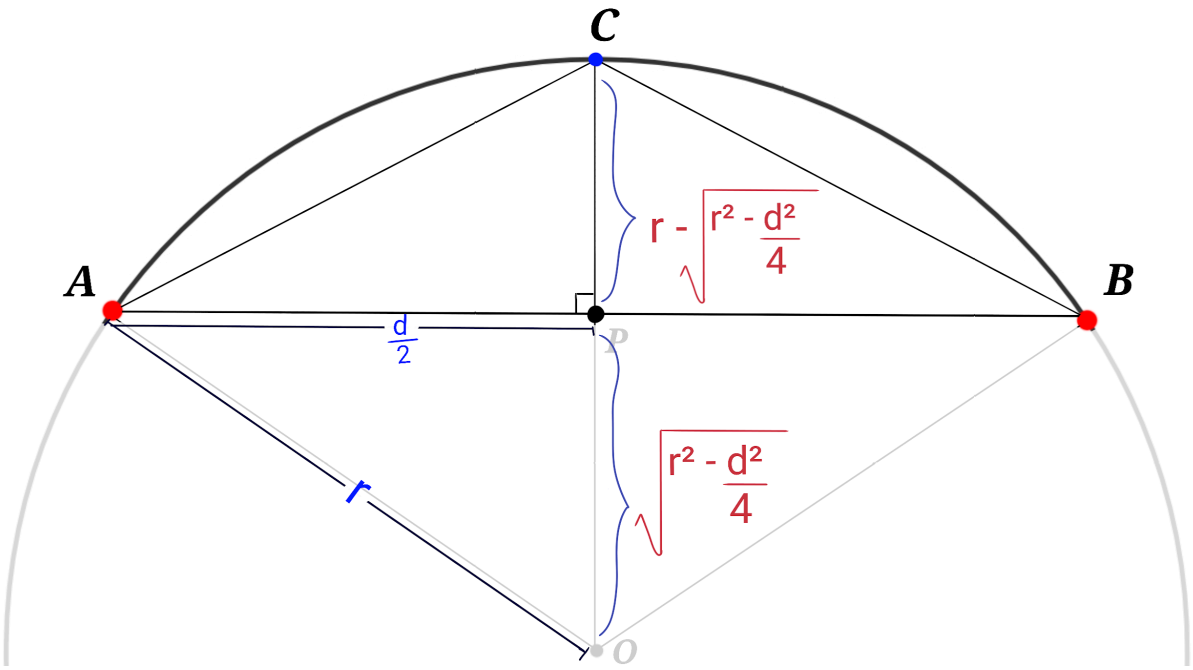






We have given two points **A** and **B,** *d units* distance apart and required to construct arc of radius *r units.*





CALCULATION

OC is a perpendicular bisector of line AB, Hence C is the farthest possible point from AB.

Since $AB = d\ units$

$AP = d/2\ units$

Using Pythagoras property,

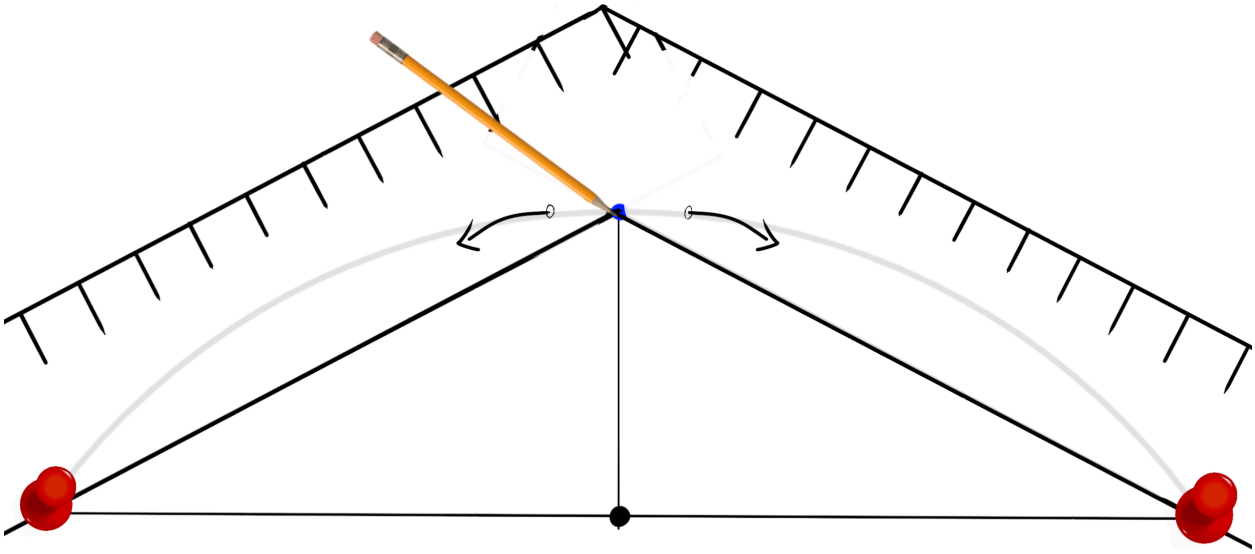
$OP = \sqrt{(r^2 - d^2/4)}$

Because OA=OB=OC = r (radius of same circle)

$CP = r - \sqrt{(r^2 - d^2/4)}$

Real life Construction :

- Locate two points, in between we have to construct an arc of given radius.
- Place nail on that point (Point A & B in diagram)
- Join it using a thread (Line AB) , locate the midpoint of thread earlier(Point P) .
- Draw a perpendicular line from thread midpoint to the side in which we have to construct an arc (from P toward C) .
- Locate the point C, as mentioned in above diagrams $r - \sqrt{(r^2 - d^2/4)}$ apart from thread midpoint.



- Nail down point C.
- Place Wooden Ruler [Have length more than AB] (or any material) on nail A & C, another ruler on B & C.
- Join these two rulers permanently .
- Remove nail C. (Don't disturb nail A & B)
- Place Pencil on Location C, Move the constructed ruler on both sides, one by one holding in top of nails A & B. (Move pencil along with ruler)
- This create more copies of points of circle and its locus gives us the required arc.