Exam Hunter
Education Consulting

# GEOMETRY
# Circle

# Circle

Definition : A circle is a shape consisting of all points in a plane that are at a given distance from a given point, the center.

Center

Radius

Diameter = 2*r

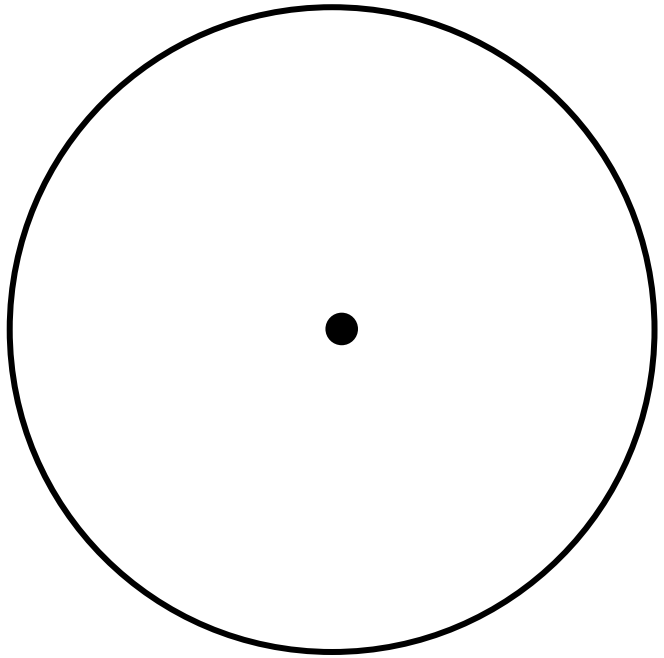
Circumference

Perimeter

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# Circle (2)

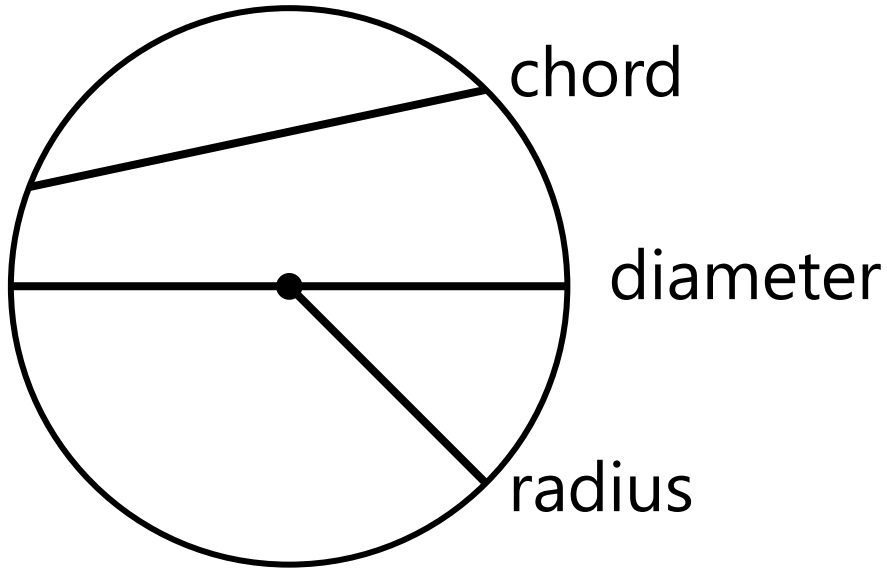
A *circle* is a set of points in a plane that are all located the same distance from a fixed point (the center of the circle).



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# Chord, radius, diameter

A chord of a circle : a line segment that has its endpoints on the circle
A diameter of the circle : a chord that passed through the center.
A radius of a circle : a segment from the center of the circle to a point on the circle. (r = ½ diameter ; diameter = 2r)
*The words “diameter” and “radius” are also used to refer to the lengths of these parts




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# Circumference and Area of a circle

The *circumference* of a circle :  the distance around the circle.

If *r* is the radius of the circle
radius = r
diameter = 2r
circumference = $2\pi r = \pi d$
*area* of a circle of radius *r* is equal to $\pi r^2$.

$\pi$ is approximately $\frac{22}{7}$ or 3.14.

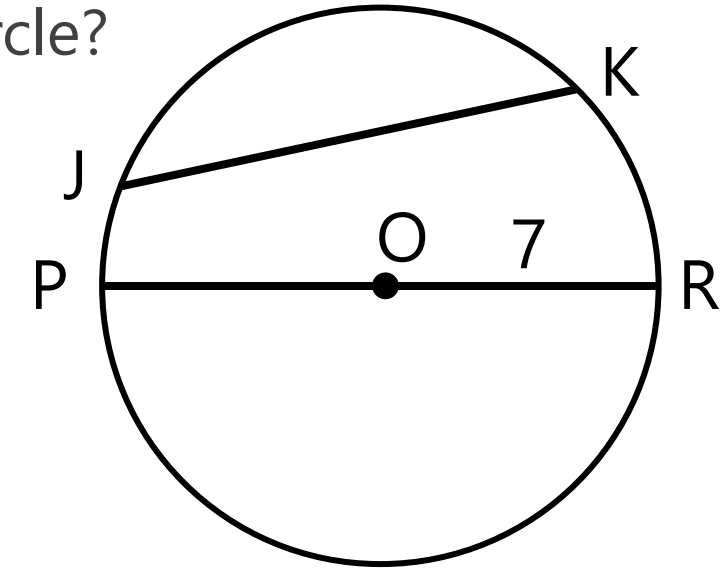
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# Circumference and Area of a circle

In the circle below,
*O* is the center of the circle and $\overline{JK}$ and $\overline{PR}$ are chords.
$\overline{PR}$ is a diameter and $\overline{OR}$ $and$ $\overline{PO}$ is a radius.

A circle has an inside degree of 360°

If $\overline{OR}$ $is$ $7cm$ what is the circumference and area of this circle?




Circumference = *2 πr or πd = 2*7 π = 14 π*

Area = *πr^2 = π*49 = 49 π*

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# Arc of a circle

Arc = portion of the circumference of a circle

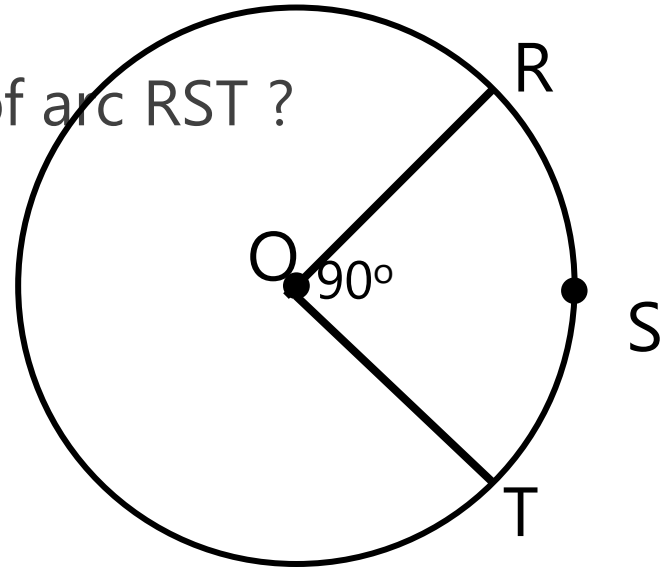
In the circle with center O below, the length of arc *RST* is $\frac{x}{360}$ of the circumference of the circle (ratio of the circumference).

$\frac{x}{360}$*circumference = length of arc

If x = 90° what is the length of arc RST ?

R = 7

1/4 * 2 $\pi$*7



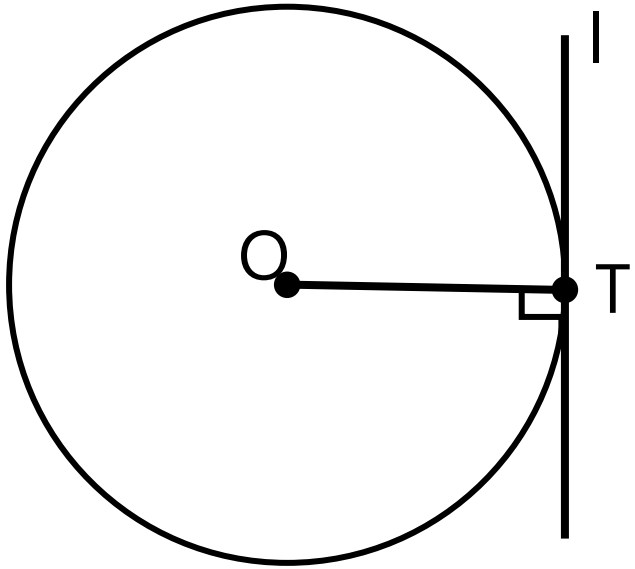

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# Tangency

A line that touch only one point in a circle is **tangent** to the circle.
The point a line touch a circle is called **point of tangency**.

A radius (and diameter) with an end point at the point of tangency is **perpendicular** to the line.

The line l is tangent to the circle and radius $\overline{OT}$ is perpendicular to l.



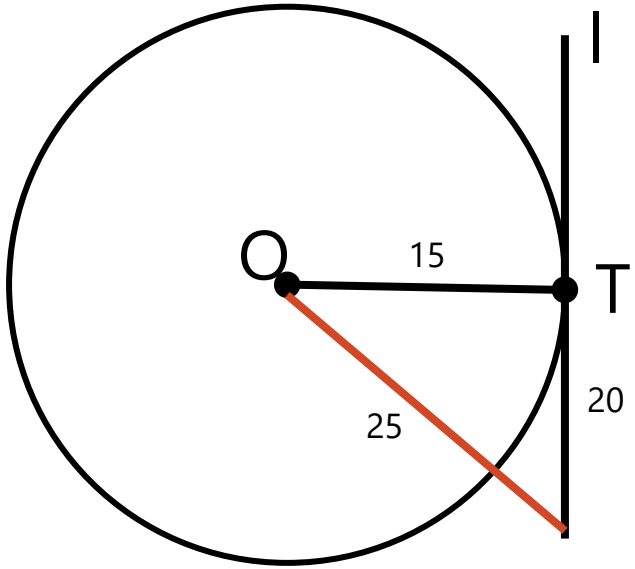

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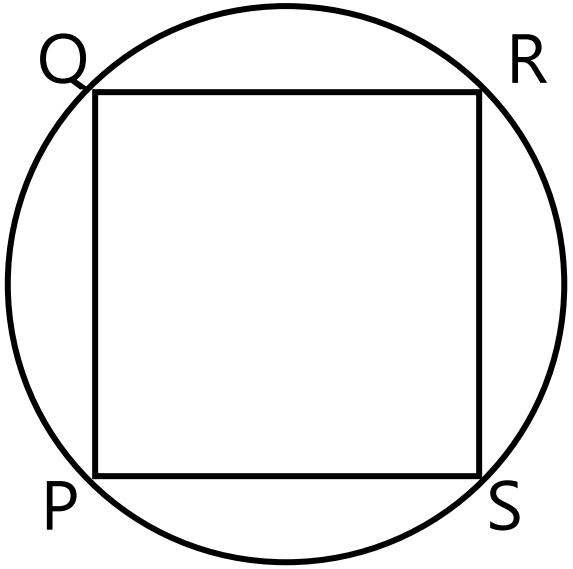
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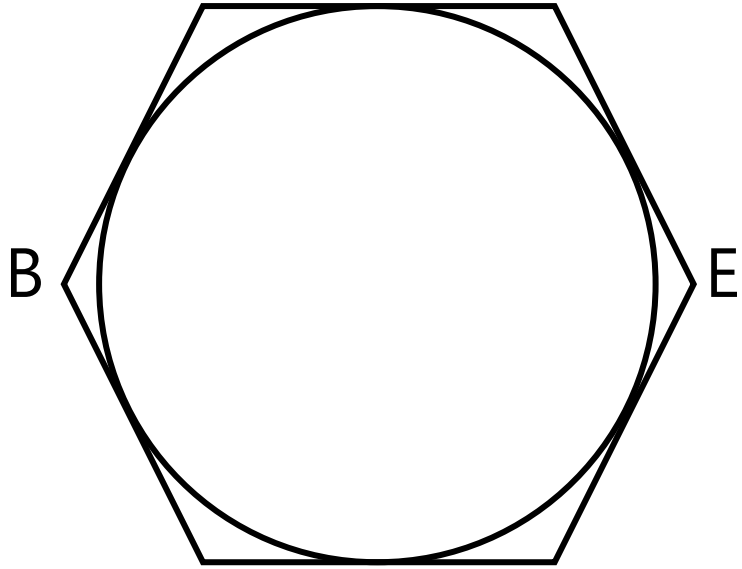

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# Inscribed and circumscribed

Inscribed = a figure is within another that touch but do not intersect.
Circumscribed = a figure cover another, touching the inside but not cutting.




A square is inscribed in a circle
A circle is circumscribed about a square




A circle is inscribed in a hexagon
A hexagon is circumscribed about a circle

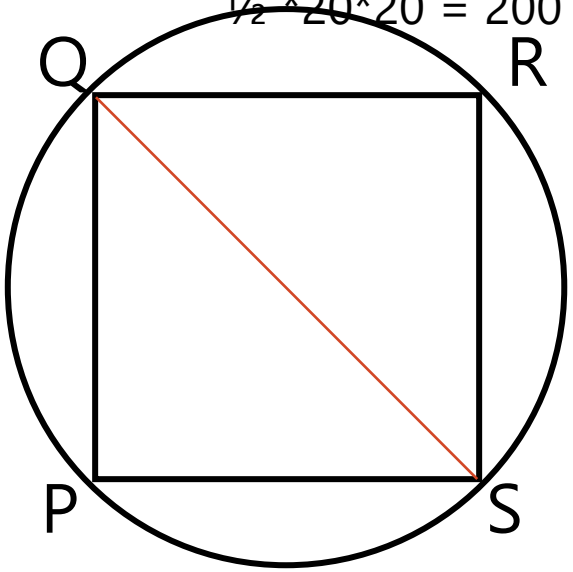
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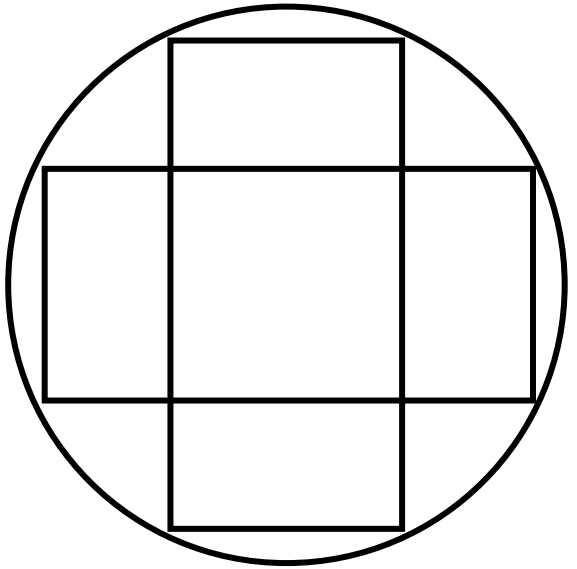
# Inscribed and circumscribed

## Rectangle inscribed in a circle that has the largest area is a square

R = 10 → D = 20 → S = 20/root2 → 20/root2 * 20/root2 → 400/2 = 200

½ *20*20 = 200



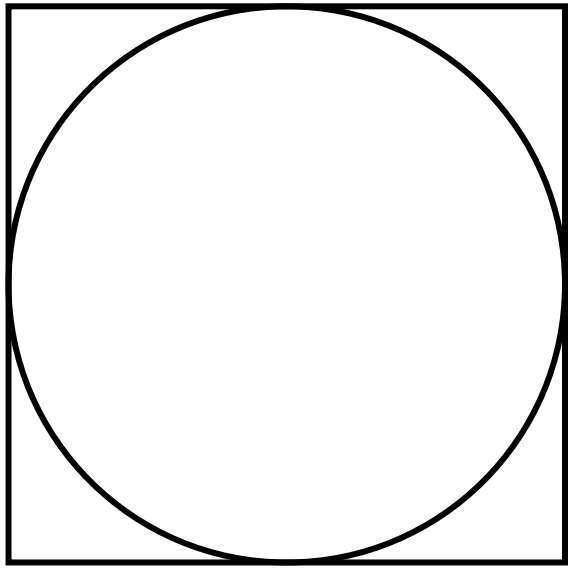
A square is inscribed in a circle

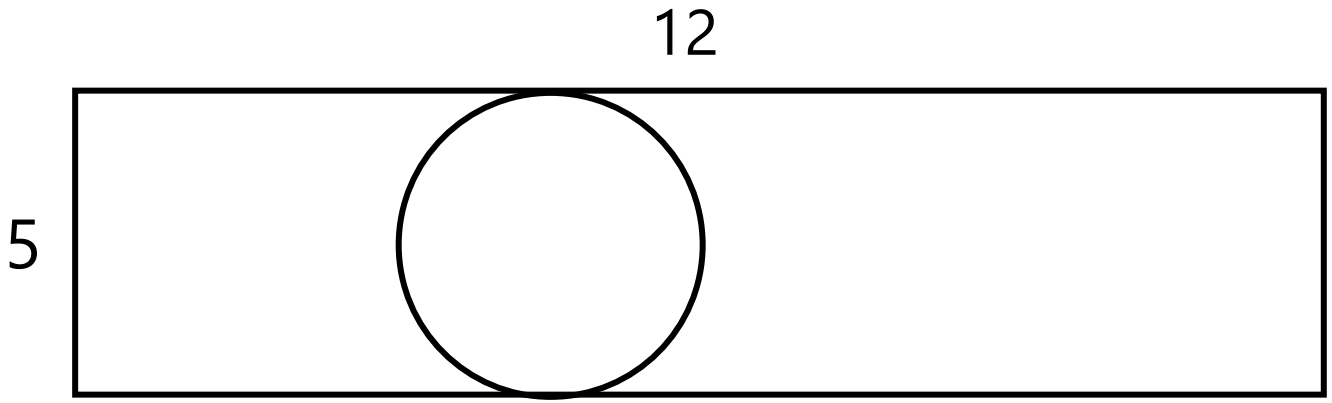
A circle is circumscribed about a square

Diagonal =

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# Inscribed and circumscribed






The diameter of a circle inscribed in a rectangle is the shorter side of that rectangle
The d of the above picture is 5

R = 5/2 = 2.5 → $\pi r^2 = \pi * (2.5)^2 = \pi$*6.25

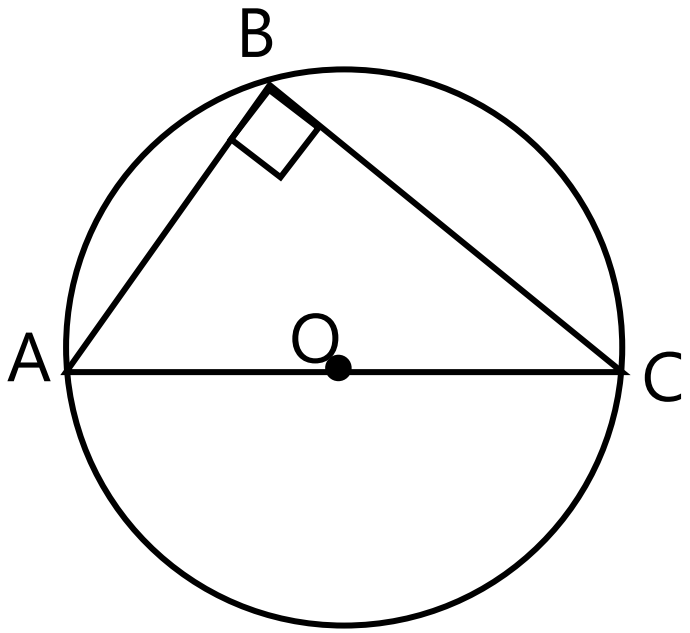
5*12 - $\pi$*6.25

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# More rules about Angles

If a triangle is inscribed in a circle so that one of its sides is a diameter of the circle, then the triangle is a right triangle.

In the circle below, $\overline{AC}$ is a diameter and the measure of $\angle ABC$ is $90°$.



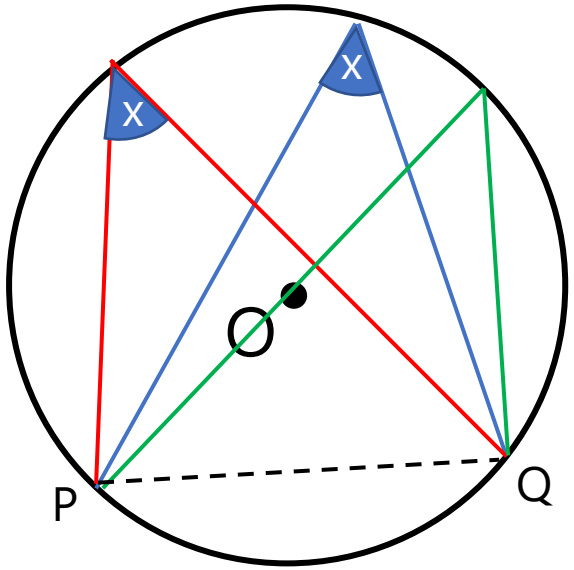

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# Inscribed Angle Theorems (1)

If start with the same arc (in this case arc PQ)

**Rule 1: the angles link to the circle are always the same (x = x)**

Rule 2: the angles link to the center of a circle is twice that of the ones at the circle



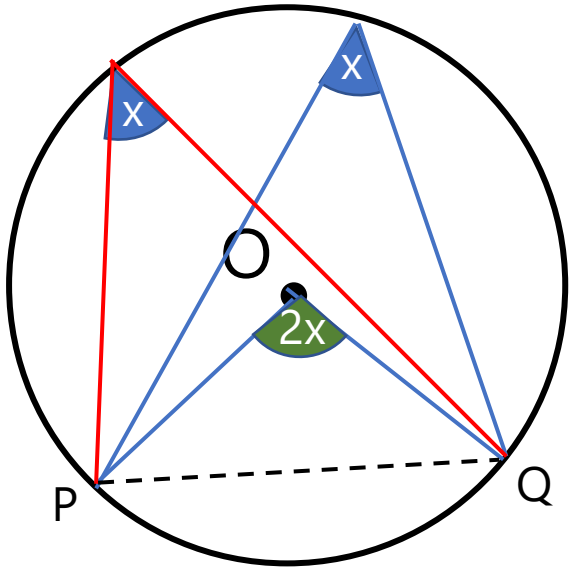

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# Inscribed Angle Theorems (2)

If start with the same arc (in this case arc PQ)

Rule 1: the angles link to the circle are always the same (x = x)

**Rule 2: the angles link to the center of a circle is twice that of the ones at the circle**



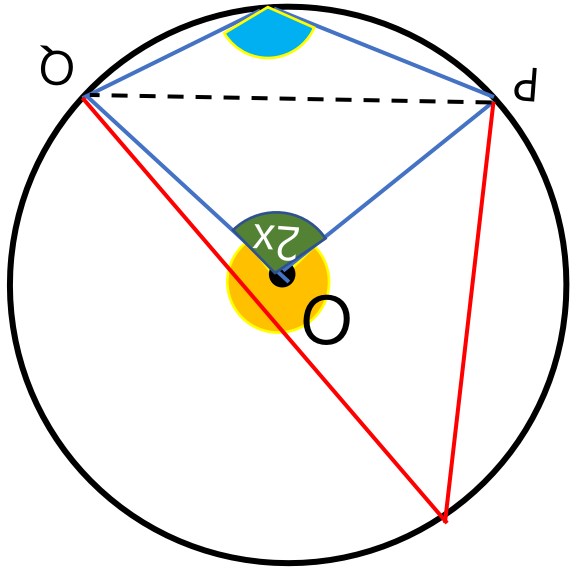

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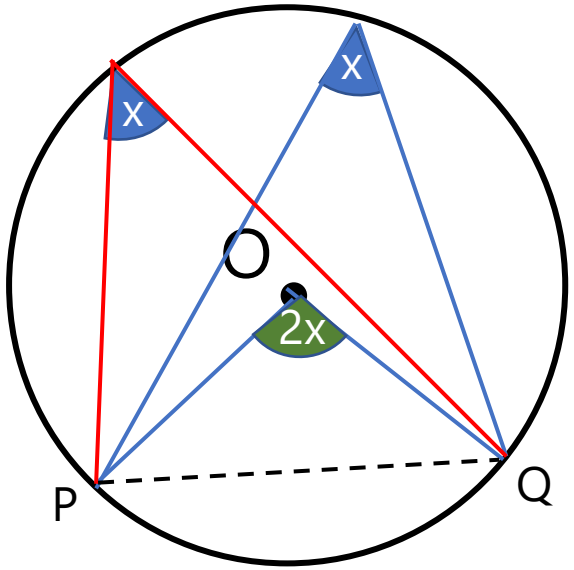
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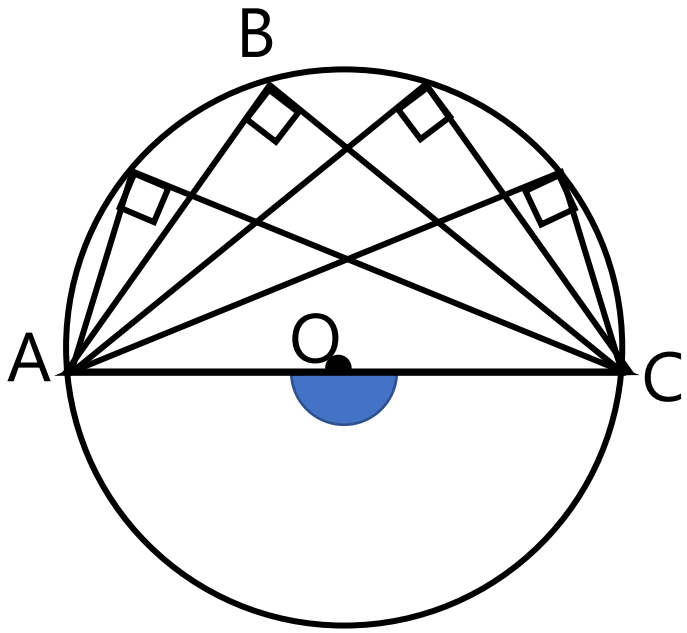

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# Inscribed Angle Theorems (3)

If start with the same arc (in this case arc PQ)

**Rule 1: the angles link to the circle are always the same (x = x)**

**Rule 2: the angles link to the center of a circle is twice that of the ones at the circle**




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