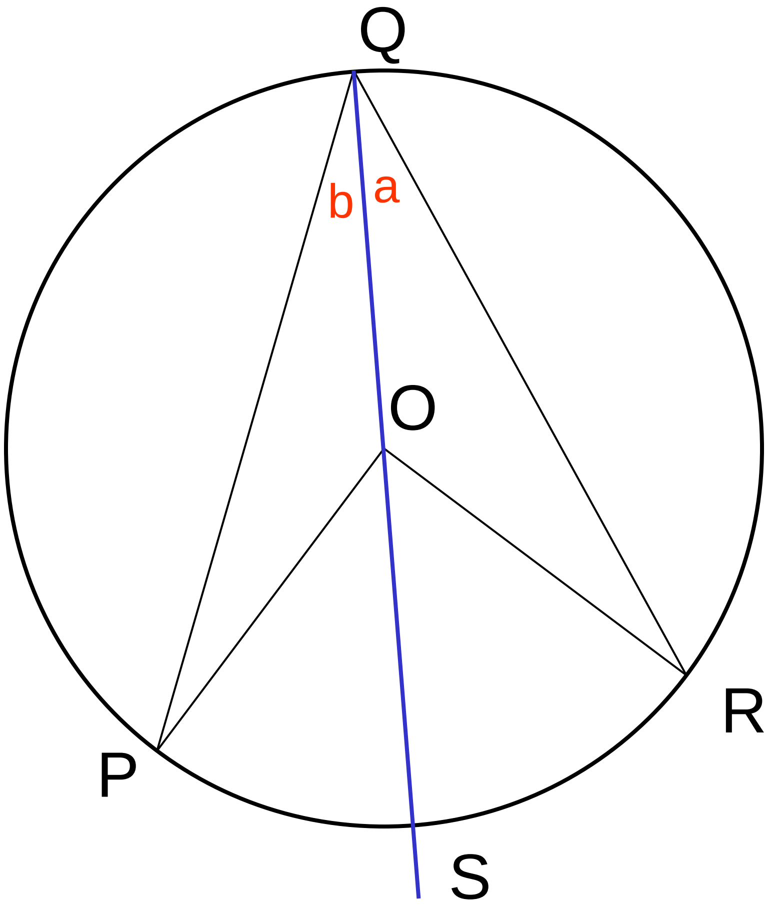
# Proof

Circle Theorems

# Contents

# Prove angle at centre is twice the angle at the circumference



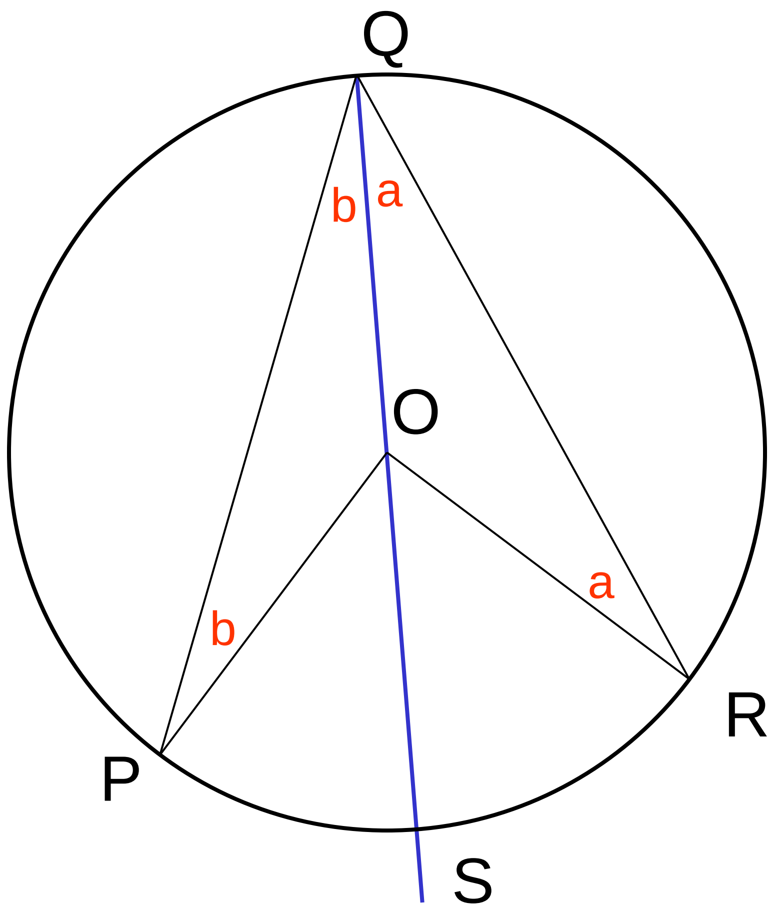

Draw line QO and extend to intersect circumference at S

Label angles

<OQR is a

<OQP is b

# Prove angle at centre is twice the angle at the circumference



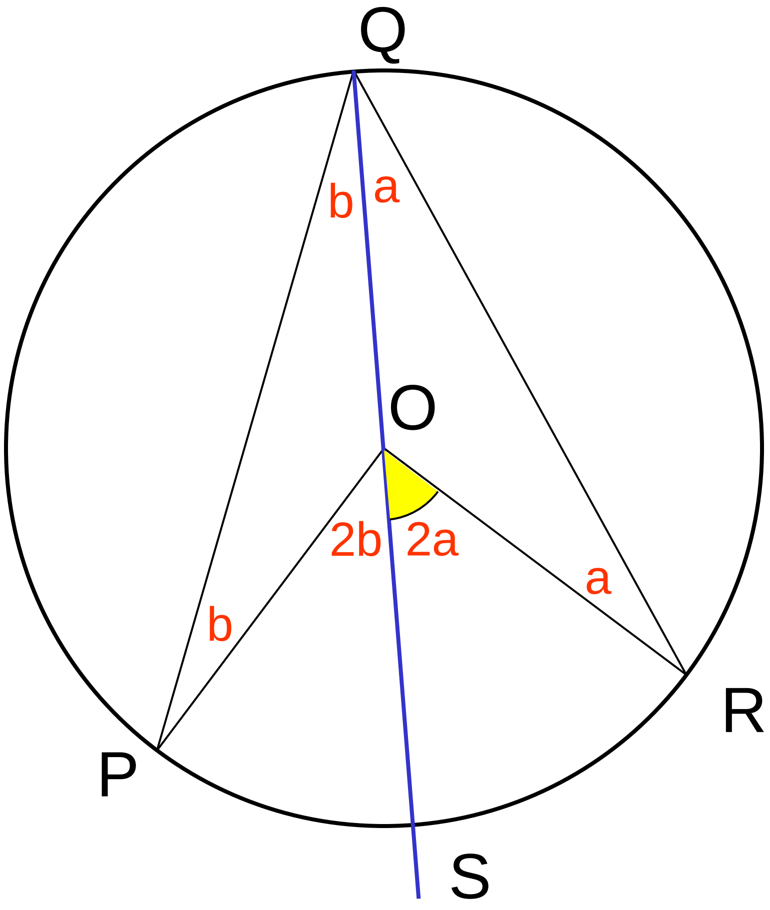

<ORQ = <OQR

Base angles in Isosceles Triangle

(OQ = OR, radii of circle)

Similarly
<OPQ = <OQP

# Prove angle at centre is twice the angle at the circumference




Consider <ROS

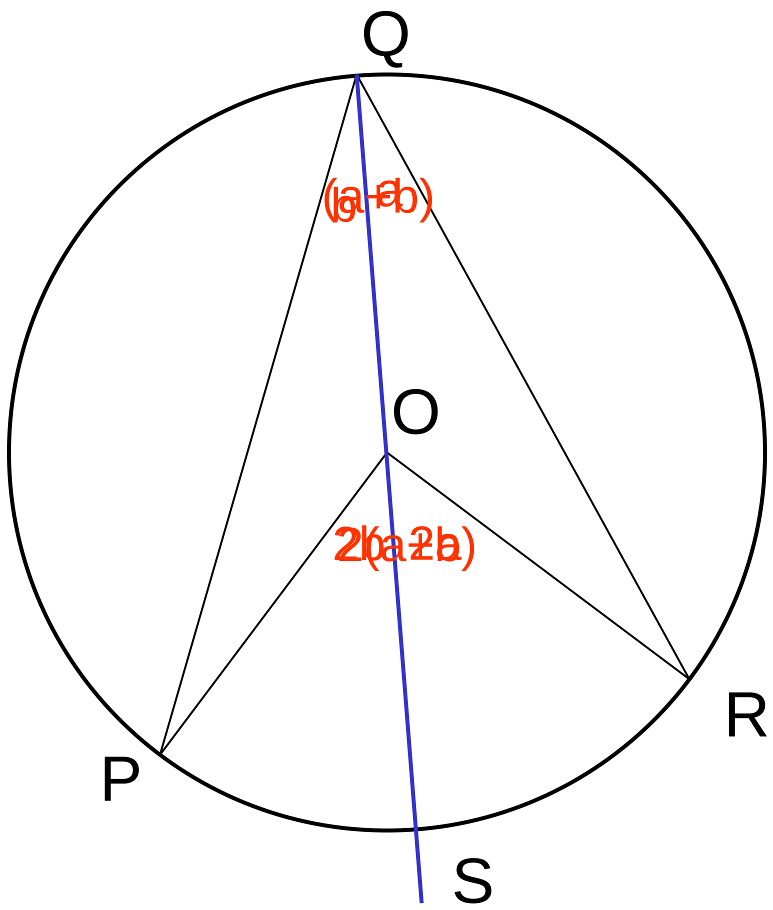
By exterior angle of triangle theorem

<ROS = 2a

Similarly

<POS = 2b

# Prove angle at centre is twice the angle at the circumference




<POR = 2a + 2b

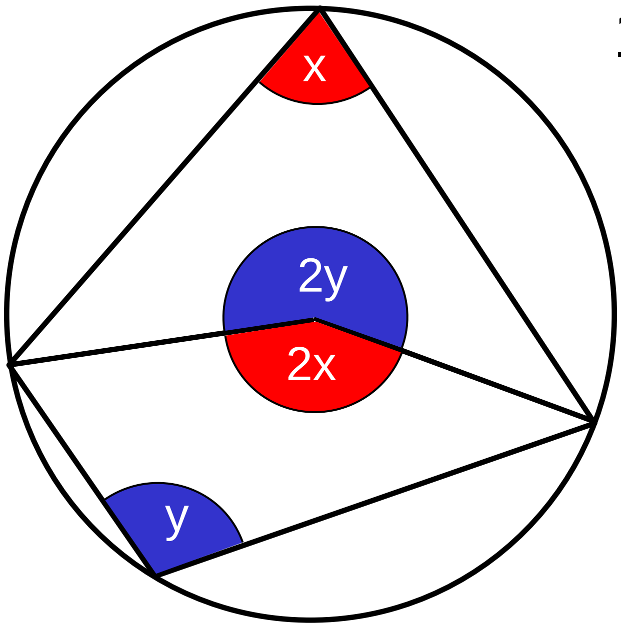
= 2(a + b)

<PQR = a + b

<POR = 2 x <PQR

Return to Menu

# Opposite Angles in a Cyclic Quadrilateral are supplementary




Required to Prove that $x + y = 180^{\circ}$

Draw in radii

The angle at the centre is TWICE the angle at the circumference

$2x + 2y = 360^{\circ}$

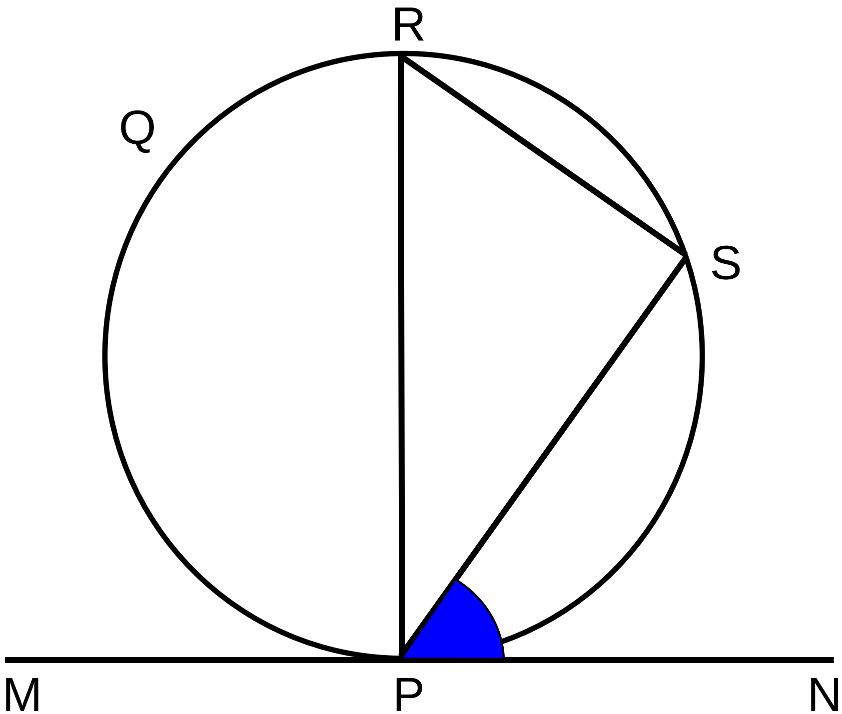
$2(x + y) = 360^{\circ}$

$x + y = 180^{\circ}$

Opposite Angles in Cyclic Quadrilateral are Supplementary

Return to Menu

# Alternate Segment Theorem




Given that

MPN is a Tangent to the circle

PS is a chord in the circle

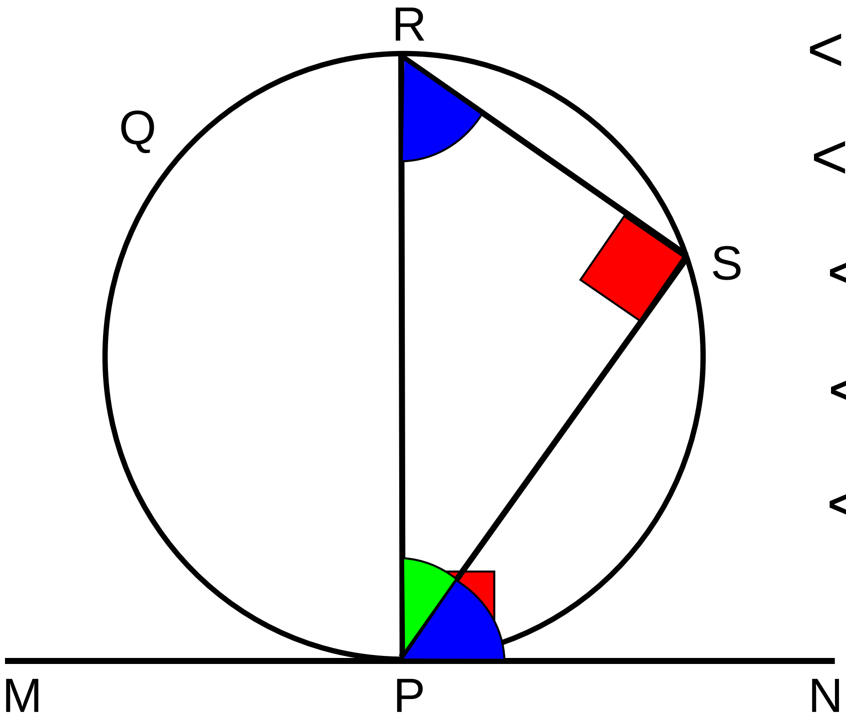
Required to Prove

… that < SPN = Any angle in the major segment PQS

Draw diameter PR

Join RS

# Alternate Segment Theorem




<PSR = 90º (Angle in Semicircle)

<NPR = 90º (Radius to a Tangent)

<NPS + <RPS = 90º

<PRS + <RPS = 90º

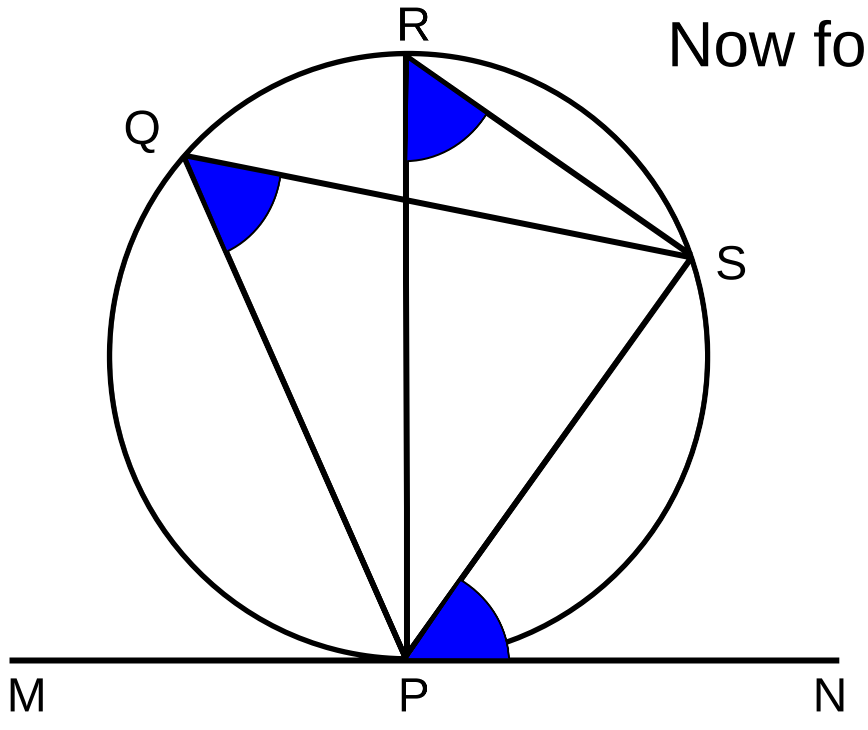
<PRS + <RPS = <NPS + <RPS

<RPS is common

<PRS = <NPS

**Special case of Rightangle Triangle on circle’s diameter**

# Alternate Segment Theorem




Now for ANY angle in Segment PQS

Join QS & PQ

Consider <PQS

<PQS = <PRS

(Angles in SAME segment)

Thus <SPN = Any Angle in Alternate Segment

Return to Menu