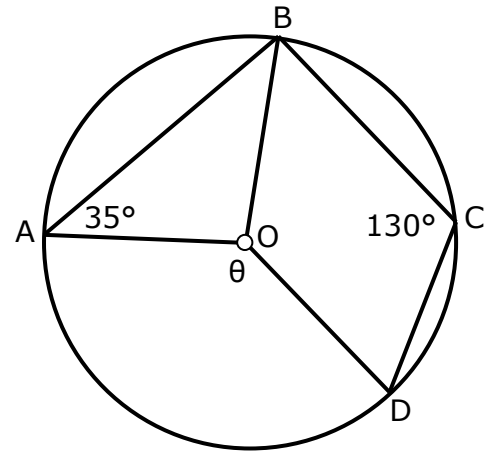
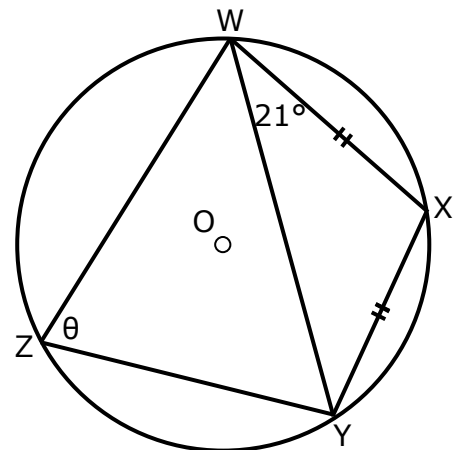


Merit+ Circle Geometry Practice #3

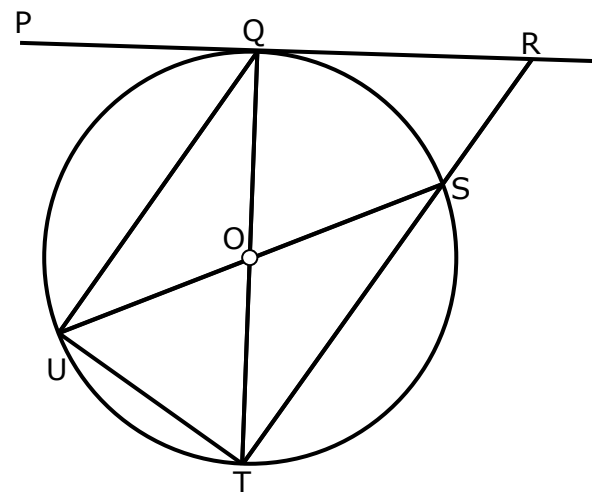
1. Find $\angle AOD$ (marked θ).



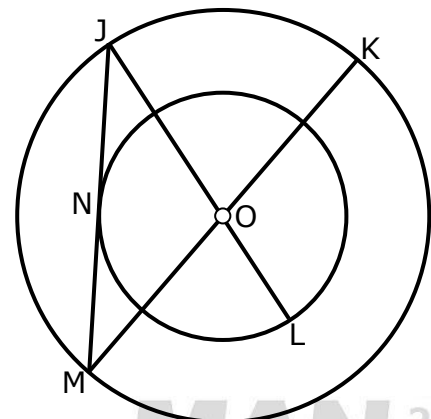
2. Find $\angle WZY$ (marked θ).



3. Show that $\angle QRT$ is half the size of $\angle QOU$.



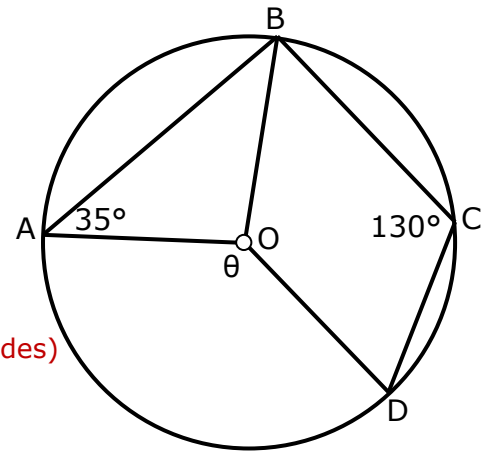
4. JM is a tangent intersecting at N.
LO is 3 units long. KO is five units long.
Find the length of JM.



Answers: Merit+ Circle Geometry Practice #3

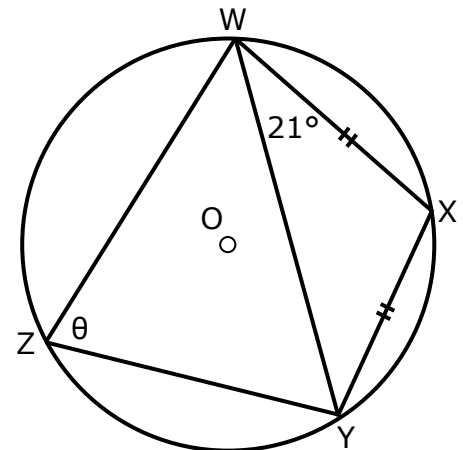
1. Find $\angle AOD$ (marked θ).

- $\angle ABO = 35^\circ$ (triangle formed by radii is isosceles)
 $\angle AOB = 110^\circ$ (interior angles of a triangle add to 180°)
 $\angle BOD$ reflex = $2 \times 130^\circ = 260^\circ$
 (angle subtended to centre is $2 \times$ the angle to the sides)
 $\angle AOD = 150^\circ$ ($\angle BOD$ reflex - $\angle AOB$)



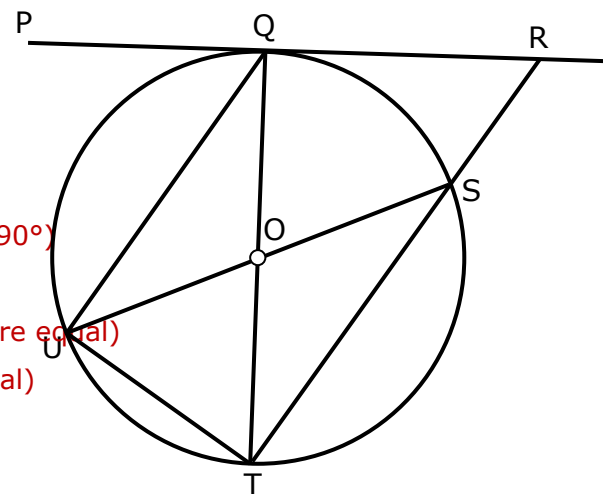
2. Find $\angle WZY$ (marked θ).

- $\angle WYX = 21^\circ$ (base angles of an isosceles triangle are equal)
 $\angle WXY = 138^\circ$ (interior angles of a triangle add to 180°)
 $\angle WZY = 42^\circ$ (opposite angles of cyclic quad add to 180°)



3. Show that $\angle QRT$ is half the size of $\angle QOU$.

- Let $\angle QRT = x$
 $\angle OQR = 90^\circ$ (tangent and radius from intersection are at 90°)
 $\angle QTR = 90^\circ - x$ (interior angles of a triangle add to 180°)
 $\angle QUS = 90^\circ - x$ (angles to edge subtended by same arc are equal)
 $\angle UQO = 90^\circ - x$ (base angles of isosceles triangle are equal)
 $\angle QOU = 2x$ (interior angles of a triangle add to 180°)
 $\angle QOU$ is $2 \times \angle QRT$



4. JM is a tangent intersecting at N.
 LO is 3 units long. KO is five units long.
 Find the length of JM.

- $NO = 3$ because it is the same size as LO (both radiuses)
 $MO = 5$ because it is the same size as KO
 $\angle MNO = 90^\circ$ (tangents are at 90° to a radius at intersection)
 MNO is a right angle triangle, so we can use Pythagoras' Theorem
 $NM = \sqrt{5^2 - 3^2} = 4$
 $JM = 2 \times NM = 8$ units long

