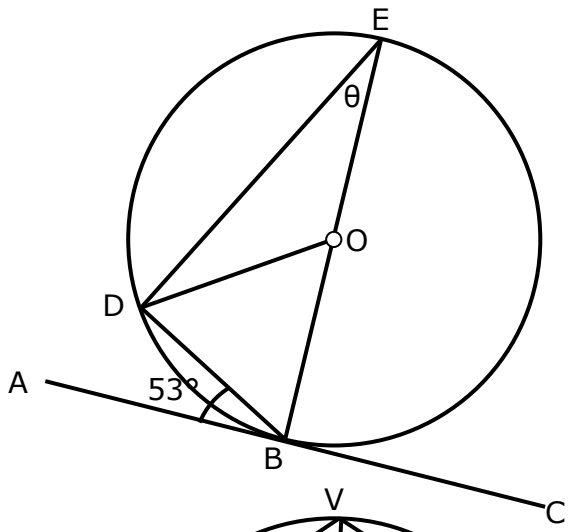
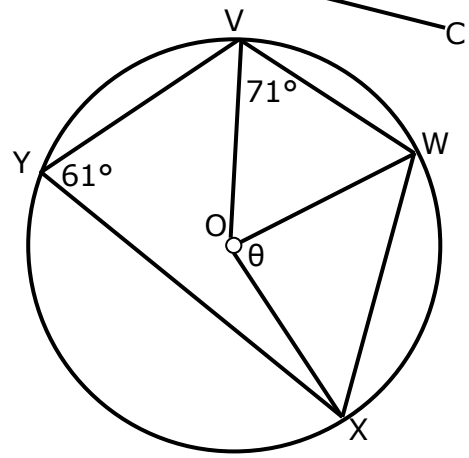
Merit+ Circle Geometry Practice #5

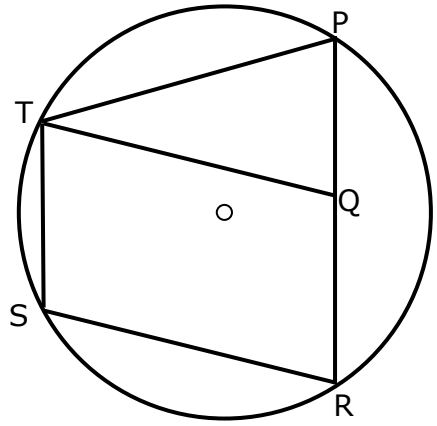
1. ∠DBA = 53°. AC is a tangent to the circle at B.
   Find ∠DEB (marked θ).



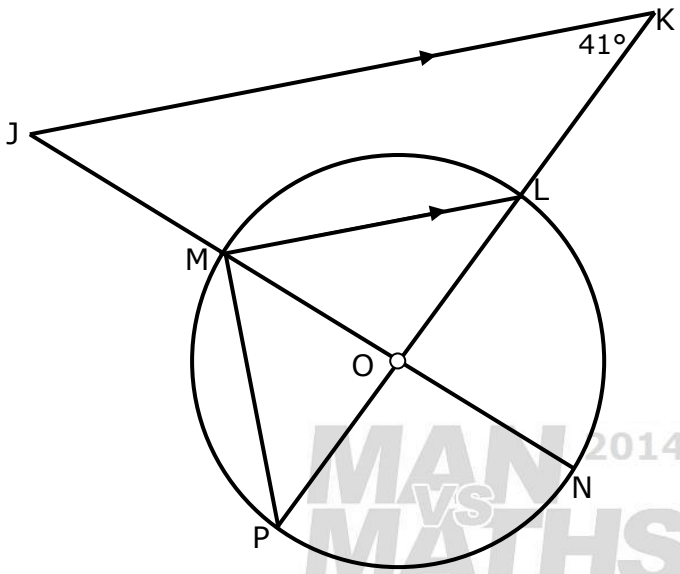
2. Find ∠WOX (marked θ).



3. QRST is a parallelogram.
   Show that ΔPQT is isosceles.

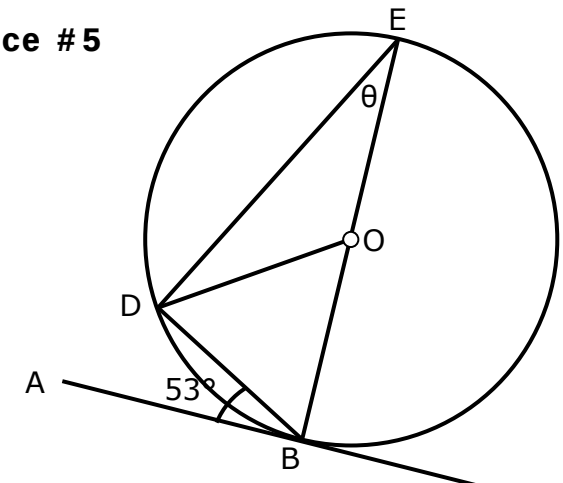


4. JK is parallel to ML
   O is the centre of the circle
   Find the size of ∠PMJ



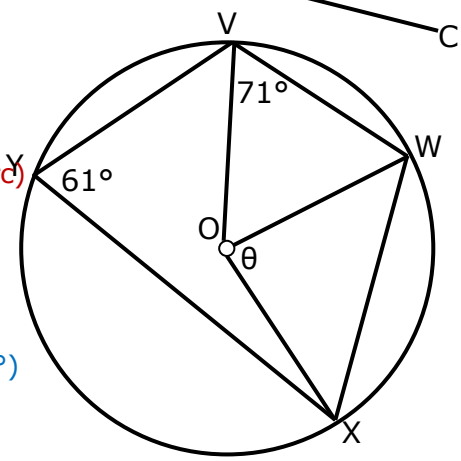
Answers: Merit+ Circle Geometry Practice #5

1. ∠DBA = 53°. AC is a tangent to the circle at B.
   Find ∠DEB (marked θ).



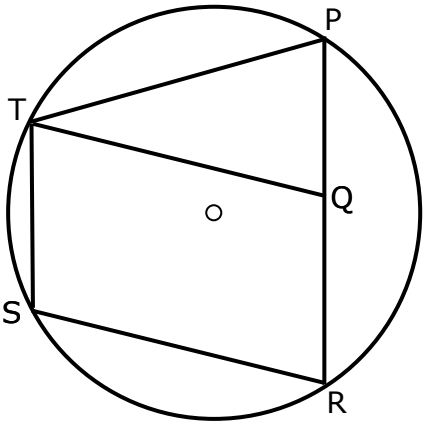
∠DBO = 37° (∠ABO = 90° as tangent ⊥ to radius)
∠DEB = 53° (interior angles Δ add to 180°)

2. Find ∠WOX (marked θ).



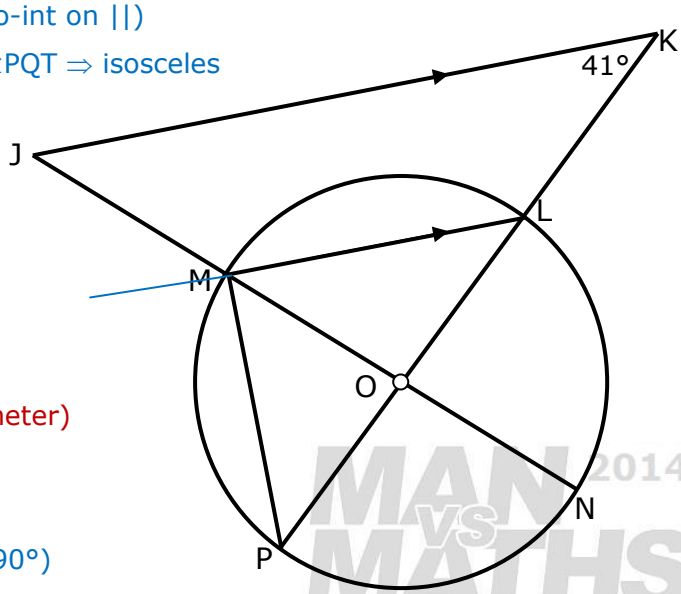
∠VWO = 71° (Δ from radii is isosceles)
∠VOW = 38° (interior angles Δ add to 180°)
∠VOX = 122° (∠ at centre = 2× angle at edge from same arc)
∠WOX = 84° (∠VOX = ∠VOW + ∠WOX)
or calculate ∠s in ΔVWO as first two steps above
∠VWX = 119° (opposite on cyclic quad add to 180°)
∠OWX = 48° (remainder after ∠VWO = 71° is taken off 119°)
∠WXO = 48° (Δ from radii is isosceles)
∠WOX =84° (interior angles of Δ add to 180°)

3. QRST is a parallelogram.
   Show that ΔPQT is isosceles.



Let ∠TPQ = x
∠TSR = 180° – x (Opposite angles cyclic quad add to 180°)
∠TQR = 180° – x (symmetry of parallelogram
∠TQP = x (angles on a line add to 180°)
As ∠TPQ = ∠TQP the ΔPQT must be isosceles
or let ∠PRS = y
∠TQP = y (corr on ||) and ∠TSR = 180° – y (co-int on ||)
∠TPQ = y (opp on cyclic quad) and so ∠TPQ = ∠PQT ⇒ isosceles

4. JK is parallel to ML
   O is the centre of the circle
   Find the size of ∠PMJ



∠OLM = 41° (corresponding on || are equal)
∠LMO = 41° (Δ from radii is isosceles)
∠OMP = 49° (∠LMP = 90° as from ends of diameter)
∠PMJ = 131° (angles on line add to 180°)
or put in light blue line shown to do last step
∠PMJ = 41° + 90° (vertically opposite ∠LMO + 90°)