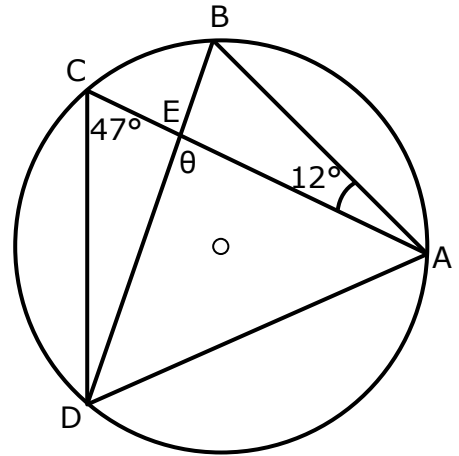


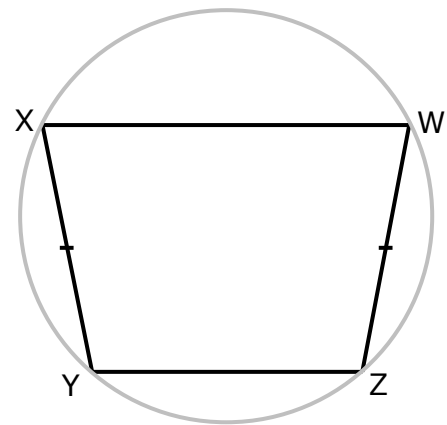
Merit+ Circle Geometry Practice #4

1. Find $\angle DEA$ (marked θ).

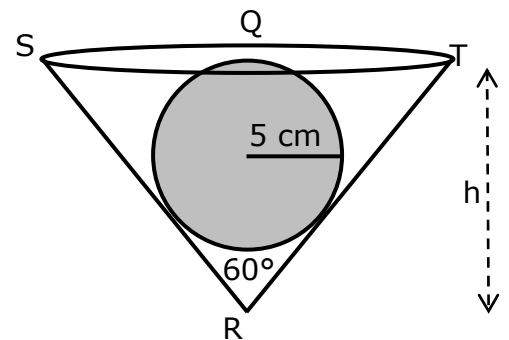


2. Show that for every isosceles trapezium a circle can be drawn which goes through all four vertices.

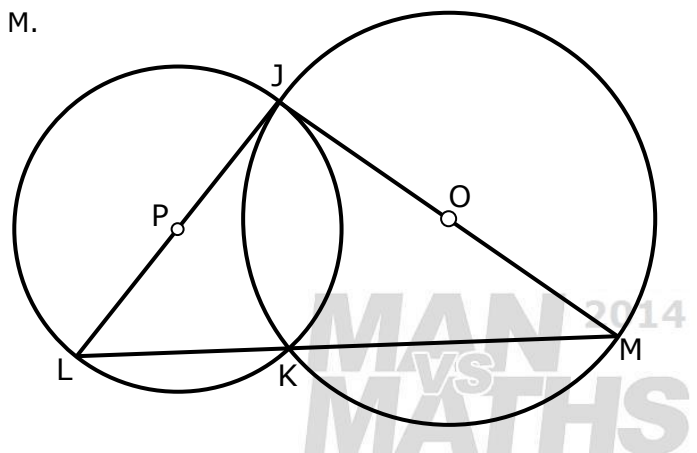
(An isosceles trapezium is one where the non-parallel sides are of equal length.)



3. A ball of radius 5 cm just fits inside a cone of 60° base as shown. What is the vertical height of the cone, h ?



4. Two circles of different sizes intersect at J and K.
From J two diameters are drawn, to L and M.
Show that LKM is a straight line.



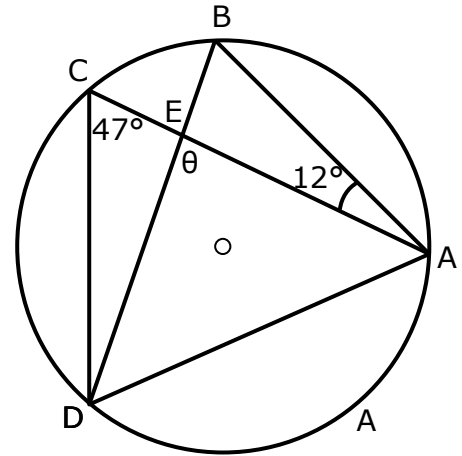
Answers: Merit+ Circle Geometry Practice #4

1. Find $\angle DEA$ (marked θ).

$\angle CDB = 12^\circ$ (angles subtended by the same arc are equal)

$\angle CED = 121^\circ$ (angles in triangle add to 180°)

$\angle DEA = 59^\circ$ (angles on a line add up to 180°)



2. Show that for every isosceles trapezium a circle can be drawn which goes through all four vertices.

(An isosceles trapezium is one where the non-parallel sides are of equal length.)

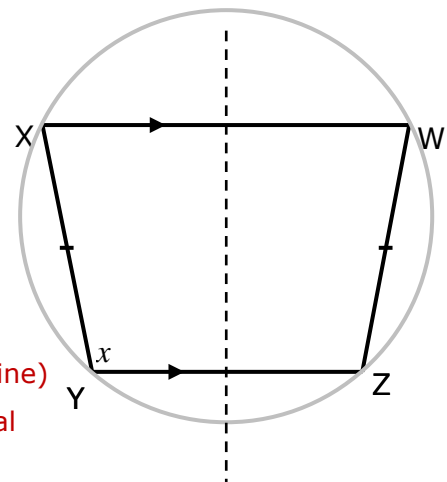
Let $\angle XYZ = x$

$\angle YXW = 121^\circ - x$ (co-interior on \parallel add to 180°)

$\angle XWZ = 121^\circ - x$ (by symmetry, reflected in dotted mirror line)

$\angle XYZ + \angle XWZ = 180^\circ \Rightarrow$ the trapezium is a cyclic quadrilateral

A cyclic quadrilateral has all four vertices on a circle.



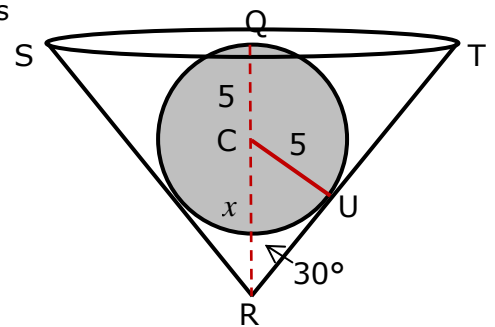
3. A ball of radius 5 cm just fits inside a cone of 60° base as shown. What is the vertical height of the cone, h ?

$h = 5 + x$ (radius of ball up + CR, distance down)

$\triangle CUR$ is right angle at U, as side RT is tangent to ball

$x = 5 \div \sin(30^\circ)$ (trig, with CU = 5, as it is a radius)

$h = 5 + 10 \Rightarrow$ the height is 15 cm



4. Two circles of different sizes intersect at J and K.
From J two diameters are drawn, to L and M.
Show that LKM is a straight line.

Draw in line JK

$\angle JKL = 90^\circ$ (angle subtended by diameter is 90°)

$\angle JKM = 90^\circ$ (angle subtended by diameter is 90°)

$\angle JKL + \angle JKM = 180^\circ$

So LKM must be straight.

