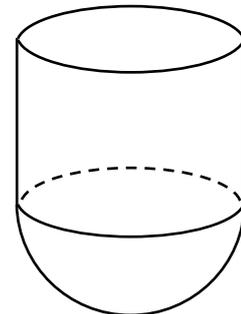


Stage Assessment 3

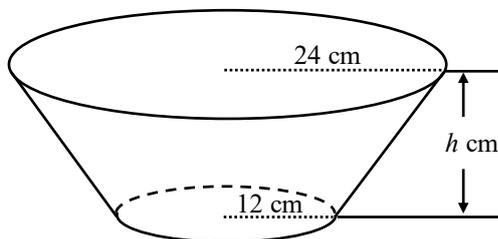
1. The angle and the perimeter of a sector are 135° and $(6\pi + 16)$ cm respectively.
 - (a) Find the radius of the sector.
 - (b) Express the area of the sector in terms of π .

2. The figure shows a solid consisting of a hemisphere of radius r cm joined to the base of a right circular cylinder of height 27 cm and base radius r cm. It is given that the ratio of the curved surface area of the hemisphere to that of the circular cylinder is 2 : 3.
 - (a) Find r .
 - (b) Express the volume of the solid in terms of π .



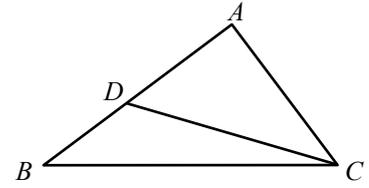
3. Four identical solid metal right circular cones of base radius R cm are melted and recast into 90 smaller identical solid right circular cones of base radius r cm and height 8 cm. It is given that the base area of a larger circular cone is 9 times that of a smaller one.
- (a) Find
- (i) $r : R$,
 - (ii) the height of a larger circular cone.
- (b) Someone claims that a smaller circular cone and a larger circular cone are similar. Do you agree? Explain your answer.

4. The figure shows a vessel of volume $5376\pi \text{ cm}^3$ in the form of an inverted frustum. It is made by cutting off the lower part of an inverted right circular cone. The upper base radius, the lower base radius and the height of the vessel are 24 cm, 12 cm and h cm respectively. The vessel is placed on a horizontal table.

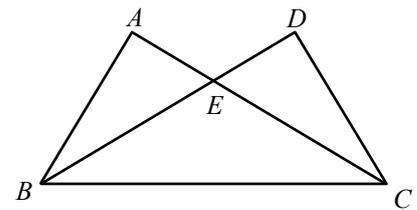


- (a) Find h .
- (b) Water is poured into the vessel until the depth of water in the vessel is $\frac{h}{2}$ cm.
- (i) Find the area of the wet curved surface of the vessel in terms of π .
- (ii) Find the remaining capacity of the vessel in terms of π .

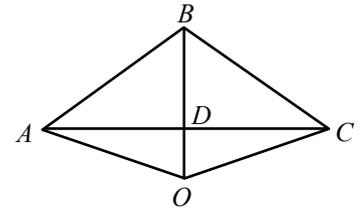
5. In the figure, D is a point lying on AB such that $\angle ABC = \angle ACD$.
- (a) Prove that $\triangle ABC \sim \triangle ACD$.
- (b) Suppose $AC = 24$ cm, $BC = 40$ cm and $AD = 18$ cm. Is AB perpendicular to AC ? Explain your answer.



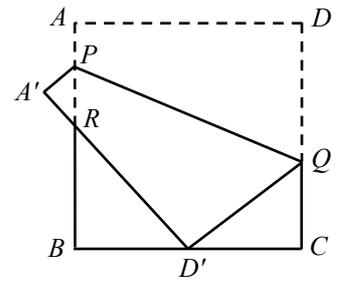
6. In the figure, AC and BD intersect at E . It is given that $BE = CE$ and $\angle ABD = \angle ACD$.
- (a) Prove that $\triangle ABC \cong \triangle DCB$.
- (b) F is a point lying on BC such that $AF \perp BC$. Suppose that $AB = 15$ cm, $BD = 20$ cm and $BF = 9$ cm.
- (i) Find the length of AF .
- (ii) Is $\triangle ABC$ a right-angled triangle? Explain your answer.



7. In the figure, $OABC$ is a quadrilateral. The diagonals AC and OB intersect at D . It is given that $OA = OB = OC$ and $AC \perp OD$.
- (a) Prove that $\triangle AOD \cong \triangle COD$.
- (b) It is given that O is the centre of the circle which passes through A , B and C . If $OA = 12$ cm and $\angle AOB = 75^\circ$, find the area of the sector $OABC$ in terms of π .



8. In the figure, a piece of square paper $ABCD$ is folded along a line segment PQ , where $CQ : DQ = 3 : 5$, so that the vertex D lies on the side BC . Let the new positions of A and D be A' and D' respectively, and R be the point of intersection of AB and $A'D'$.



- (a) Prove that $\triangle BD'R \sim \triangle CQD'$.
- (b) It is given that $CD' = 12$ cm.
- Find the length of DQ .
 - Hence, find the length of $A'R$.