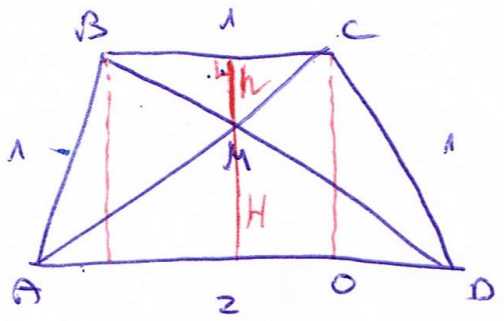
3.42
4



.א

$OD = \frac{1}{2} \rightarrow CO = \sqrt{1-(\frac{1}{2})^2} = \frac{\sqrt{3}}{2}$

$S_{ACD} = \frac{\frac{\sqrt{3}}{2} \cdot 2}{2} = \frac{\sqrt{3}}{2}$

(S.S) $\triangle BMC \sim \triangle AMD$

$$\frac{1}{2} = \frac{h}{H}$$

$\frac{\sqrt{3}}{2} = CO = h + H = 3h \rightarrow h = \frac{\sqrt{3}}{6} \quad H = \frac{\sqrt{3}}{3}$

$S_{AMD} = \frac{H \cdot AD}{2} = \frac{\frac{\sqrt{3}}{3} \cdot 2}{2} = \frac{\sqrt{3}}{3}$

.ב $S_{CMD} = S_{ACD} - S_{AMD} = \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{3} = \frac{\sqrt{3}}{6}$

.ג $AC = \sqrt{CO^2 + AO^2} = \sqrt{\frac{3}{4} + (\frac{1}{2})^2} = \sqrt{3}$

$S_{ABC} = \frac{CO \cdot BC}{2} = \frac{\frac{\sqrt{3}}{2} \cdot 1}{2} = \frac{\sqrt{3}}{4}$

$S_{ABCD} = S_{ABC} + S_{ACD} = \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{4}$

$S_{ABCD} = \frac{AC \cdot BD \cdot \sin \sphericalangle CMD}{2}$

$\frac{3\sqrt{3}}{4} = \frac{(\sqrt{3})^2 \sin \sphericalangle CMD}{2} \rightarrow \sin \sphericalangle CMD = \frac{\sqrt{3}}{2}$

$\boxed{\sphericalangle CMD = 60^\circ}$