ex 8.3 exemplar IX

① let three equal angles be $x^\circ, x^\circ, x^\circ$

$x + x + x + 108 = 360^\circ$ [angle sum prop. of △]

$\Rightarrow 3x = 360 - 108$

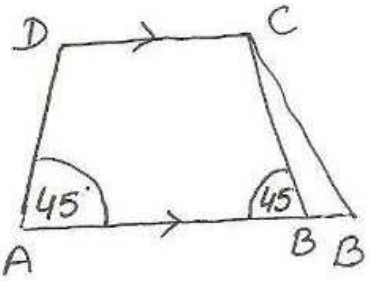
$\Rightarrow 3x = 252$

$\Rightarrow x = \frac{252}{3}$

$= 84$

$\therefore$ each equal angle $= 84^\circ$

②



Sol DC ∥ AB

$\angle A + \angle D = 180^\circ$ (cons ∠s)

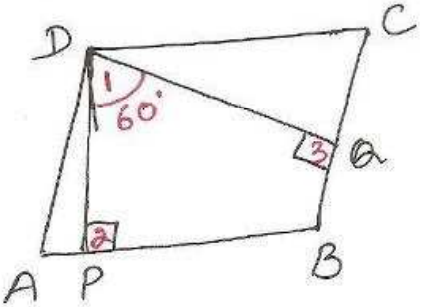
$45^\circ + \angle D = 180^\circ$

$\Rightarrow \angle D = 180^\circ - 45$

$= 135^\circ$

Sim. $\angle C = 135^\circ$

③



Sol In □ APBQ

$\angle 1 + \angle 2 + \angle B + \angle 3 = 360^\circ$

$60 + 90 + \angle B + 90^\circ = 360$

$\Rightarrow \angle B = 360^\circ - 240$

$= 120^\circ$

$\angle ADC = \angle B = 120^\circ$ (opp. angles of a ∥gm)

AD ∥ BC (opp. ∠s of a ∥gm)

$\angle A + \angle B = 180^\circ$ (cons ∠s)

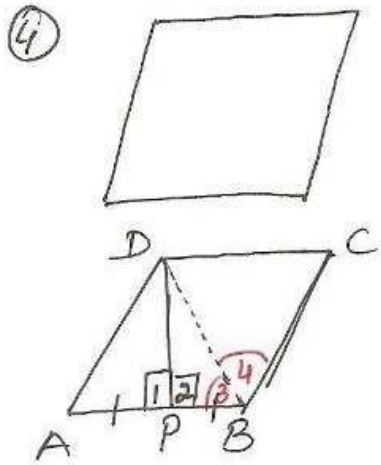
$\angle A + 120^\circ = 180^\circ$

$\Rightarrow \angle A = 180^\circ - 120^\circ$

$= 60^\circ$

$\angle C = \angle A = 60^\circ$ (opp. ∠s of a ∥gm)

④



Sol. $\triangle APD \cong \triangle BPD$ by SAS prop.

$AP = BP$

$\angle 1 = \angle 2 = 90^\circ$

$PD = PD$

$\angle A = \angle 3$ (cpct)

But $\angle 3 = \angle 4$ [diagonal bisects opp angles of a rhombus]

$\therefore \angle A = \angle 3 = \angle 4$ ... (1)

AD ∥ BC

$\angle A + \angle ABC = 180^\circ$

$\angle A + \angle 3 + \angle 4 = 180^\circ$

$\angle A + \angle A + \angle A = 180^\circ$ (using i)

$\Rightarrow 3\angle A = 180^\circ$

$\Rightarrow \angle A = \frac{180}{3}$

$= 60^\circ$

$\angle ABC = \angle 3 + \angle 4$

$= 60 + 60$

$= 120^\circ$

$\angle C = \angle A = 60^\circ$

$\angle ADC = \angle ABC = 120^\circ$ [opp. ∠s of a rhombus]