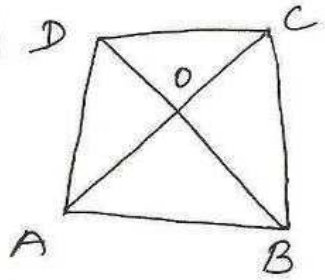
ex 7.4 1x exemplar

(12)



to prove $AB+BC+CD+DA > AC+BD$

proof

In $\triangle ABC$

$AB+BC > AC \cdots (I)$

In $\triangle BCD$

$BC+CD > BD \cdots (II)$

In $\triangle CDA$

$CD+DA > AC \cdots (III)$

In $\triangle DAB$

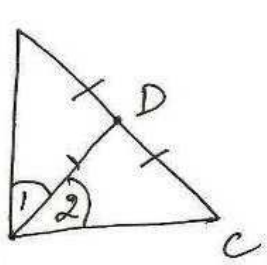
$AD+AB > BD \cdots (IV)$

$(I)+(II)+(III)+(IV)$

$2(AB+BC+CD+DA) > 2(AC+BD)$

$\Rightarrow AB+BC+CD+DA > AC+BD$

(13)



to prove $\angle ABC = 90^\circ$

proof $BD = \frac{1}{2}AC \cdots (I)$

$AD = CD = \frac{1}{2}AC \cdots (II)$

[$\because$ D is midpt. of AC]

From (I), (II)

$AD = BD = CD$

In $\triangle DAB$

$AD = BD$

$\Rightarrow \angle 1 = \angle A \cdots (III)$ (isos. $\triangle$ prop.)

In $\triangle DBC$

$BD = CD$

$\angle C = \angle 2 \cdots (IV)$ (do)

In $\triangle ABC$

$\angle A + \angle ABC + \angle C = 180^\circ$ [angle sum prop. of $\triangle$]

$\angle 1 + \angle ABC + \angle 2 = 180^\circ$ [$\because \angle A = \angle 1$, $\angle C = \angle 2$]

$\angle 1 + \angle 2 + \angle ABC = 180$

$\angle ABC + \angle ABC = 180$

$\Rightarrow 2\angle ABC = 180^\circ$

$\Rightarrow \angle ABC = 90^\circ$