

class VII, ex 15C, P3

Solutions by Dev Anoop

5. to prove $AB + BC + AC > 2AP$

proof In $\triangle ABP$

$$AB + BP > AP \dots \textcircled{i} \quad *$$

In $\triangle ACP$

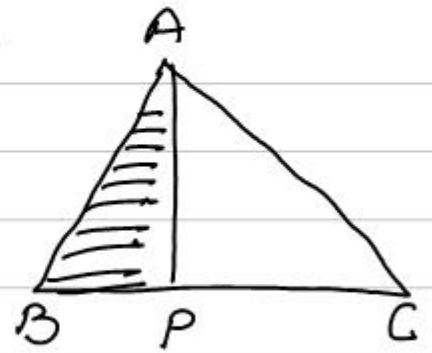
$$AC + CP > AP \dots \textcircled{ii} \quad *$$

$$\textcircled{i} + \textcircled{ii}$$

$$AB + BP + CP + AC > AP + AP$$

$$\Rightarrow AB + BC + AC > 2AP$$

* Sum of any two sides of a \triangle is greater than third side.



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

proof In $\triangle DAB$

$$AB + DA > BD \dots \textcircled{i} \quad \left[\begin{array}{l} \text{sum of any 2 sides of } \triangle \\ \text{is greater than third} \\ \text{side} \end{array} \right]$$

In $\triangle ABC$

$$AB + BC > AC \dots \textcircled{ii}$$

(do)

In $\triangle BCD$

$$BC + CD > BD \dots \textcircled{iii}$$

(do)

In $\triangle CDA$

$$CD + DA > AC \dots \textcircled{iv} \quad (\text{do})$$

$$\textcircled{i} + \textcircled{ii} + \textcircled{iii} + \textcircled{iv}$$

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

$$\cancel{2} (AB + BC + CD + DA) > \cancel{2} (AC + BD)$$

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

