7.4.3

let the point of intersection of BC and AD be O

In Δ ABO
= $\angle B < \angle A$

Therefore, = $AO < BO$
side opposite to greater angle is largest

Similarly
In Δ COD
= $\angle C < \angle D$

Therefore = $DO < CO$

side opposite to greater angle is largest

(1) + (2) we get,

$BO + OC > AO + DO$

= $BC > AD$

Hence proved.

7.4, 4

be 0

To proof - $\angle A > \angle C$
$\angle B > \angle D$

In ΔABD, we see that
$AB < AD < BD$
So, $ADB < ABD$ — (i) (angle opp. to larger side is larger)

Now, in ΔACD
$AC < DC < BD$
Hence, it can be said that
$BDC < CBD$ — (ii)

Now, by adding equation (i) and (ii) we get,
$ADB + BDC < ABD + CBD$
$ADC < ABC$
$\boxed{B > D}$

Similarly in ΔABC.
$ACB < BAC$ — (iii) (angle opp. to the larger side is always large

Now in ΔADC.
$DCA < DAC$ — (iv)

Now by adding equation (iii) and (iv) we
$ACB + DCA < BAC + DAC$
$= BCD < BAD$
$\therefore \boxed{A > C}$

Hence proved.

7.4, 5

Given, $PR > PQ$ is PS bisect $\angle QPR$

To prove – $\angle PSR > \angle PSQ$

Proof –

In $\triangle PQR$

As $PR > PQ$

$\therefore \angle PQS > \angle PRS$ – ① (angles opp to greater side is greatter)

As, PS bisect $\angle P$ hence

$\angle QPS = \angle RPS$ – ②

In $\triangle PQS$

$\angle PSR$ is exterior angle

$\angle QPS + \angle PQS = \angle PSR$ – ③

In $\triangle PRS$

$\angle PSQ$ is exterior angle

$\angle PRS + \angle RPS = \angle PSQ$ – ④

Adding equation ① & ②

$\angle PQS + \angle QPS >$ ~~LPRP~~ $\angle PRS + \angle RPS$ – ⑤

Put value of equation ③ & ④ in ⑤

$\angle PSR > \angle PSQ$