



given - In figure  $\angle Q = 2\angle R$ , PS bisects  $\angle QPR$ ,  $PQ = SR$

to find  $\angle APR$

const - draw AT bisector of  $\angle PQR$  intersecting PR at T, join ST

solution let  $\angle R = x^\circ$

$$\angle PQR = 2\angle R = 2x^\circ$$

$$\angle 1 = \angle 2 = \frac{1}{2} \angle PQR = x^\circ$$

[ $\because$  AT is bisector of  $\angle PQR$ ]

In  $\triangle TAR$ ,  $\angle 2 = \angle R$

(each  $x^\circ$ )

$$\therefore TR = TA$$

(converse of isosceles  $\Delta$  prop)

In  $\triangle PAT$  and  $\triangle SRT$

$$PQ = SR$$

(given)

$$\angle 1 = \angle R$$

(proved)

$$AT = RT$$

$\therefore \triangle PAT \cong \triangle SRT$  by SAS rule (cpct)

$$\Rightarrow \frac{\angle PAT}{PT} = \frac{\angle RST}{ST}$$

(cpct)