let $\angle 3 = \angle 4 = x^\circ$ ($\because$ PS is bisector of $\angle QPR$)

$\angle QPR \ (\angle QPT) = \angle 3 + \angle 4$
$= 2y^\circ$

$\therefore \angle RST = \angle QPT = 2y^\circ$

In $\triangle TPS$, $PT = ST$ (proved)
$\angle 5 = \angle 4 = y$ (isosceles $\triangle$ property)

$\angle PSR$ is exterior angle of $\triangle PQS$

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

$3y = y + 2x$

$\Rightarrow 2y = 2x$

$\Rightarrow y = x$

In $\triangle PQR$

$\angle P + \angle Q + \angle R = 180^\circ$

$2y + 2x + x = 180^\circ$

$2x + 3x = 180^\circ$ ($\because x = y$)

$\Rightarrow 5x = 180$

$\Rightarrow x = \frac{180}{5}$

$\therefore x = y = 36^\circ$

$\angle QPR = 2y$
$= 72^\circ$