Exercise 9A

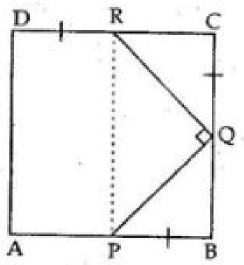
Question 7:

Given : A square ABCD in which $\angle PQR = 90^\circ$ and $PB = QC = DR$

To Prove : (i) $QB = RC$

(ii) $PQ = QR$

(iii) $\angle QPR = 45^\circ$



Proof :

(i) Consider the line segement QB:

$QB = BC - QC$

$= CD - DR$ [$\because$ ABCD is a square, so $BC = DC, QC = DR$(given)]

$QB = RC$ ......(1)

(ii) In ΔPBQ and ΔQCR, we have

$PB = QC$ [Given]

$\angle PBQ = \angle QCR = 90^\circ$ [$\because$ ABCD is a square]

and $QB = RC$ [from (1)]

Thus by Side-Angle-Side criterion of congruence, we have

$\Delta PBQ \cong \Delta QCR$ [By SAS]

$\Rightarrow$ $PQ = QR$ [By c.p.c.t]

(iii) Given that, $PQ = QR$

So, in ΔPQR

$\angle QPR = \angle QRP$ [isosceles triangle, so base angles are equal]

By the angle sum property, in ΔPQR

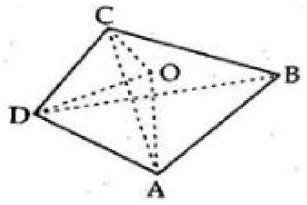
$\angle QPR + \angle QRP + 90^\circ = 180^\circ$

$\Rightarrow \angle QPR + \angle QPR = 180^\circ - 90^\circ = 90^\circ$

$\therefore$ $\angle QPR = \dfrac{90}{2} = 45^\circ.$

Question 8:

Given: O is a point within a quadrilateral ABCD



To Prove : $OA + OB + OC + OD > AC + BD$

Construction : Join AC and BD

Proof : In ΔACO,

$OA + OC > AC$ ...(i)

[$\because$ in a tringle, sum of any two sides is greater than the third side]

Similarly, In ΔBOD,

$OB + OD > BD$ ...(ii)

Adding both sides of (i) and (ii), we get;

$OA + OC + OB + OD > AC + BD$ (Proved)

*********** END **********