a) $OA + AB = OB$

$\Rightarrow AB = OB - OA$

$\Rightarrow \underline{AB = \bar{b} - \bar{a}}$

b) $OA : AC = 1 : 3$

$\Rightarrow \dfrac{OA}{AC} = \dfrac{1}{3}$

$\Rightarrow 3OA = AC$

OR $AC = 3OA$

But $OA = \bar{a}$

$\Rightarrow \underline{AC = 3\bar{a}}$

c) $OD = 4OB$

but $OB = \bar{b}$

$\underline{OD = 4\bar{b}}$

Now, $OC + CD = OD$

$CD = OD - OC$

$= 4\bar{b} - OC$

Also $OC = OA + AC$

$= \bar{a} + 3\bar{a}$

$OC = 4\bar{a}$

$\underline{CD = 4\bar{b} - 4\bar{a}}$

d) $AB = \bar{b} - \bar{a}$

$CD = 4\bar{b} - 4\bar{a}$

$= 4(\bar{b} - \bar{a})$

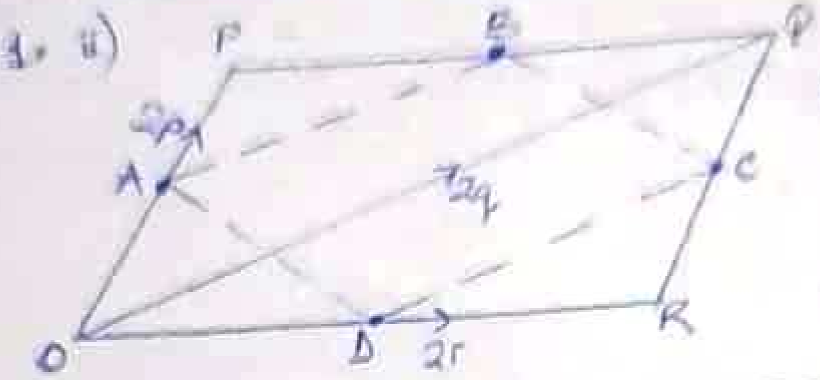
$CD = 4AB$

CD is a scalar multiple of AB

CD and AB are parallel. Also CD and AB have the same direction vector $\bar{b} - \bar{a}$. Hence parallel.

SOLUTIONS OF EXERCISES

1. i)



a) $OA = \frac{1}{2} OP$

$OA = \frac{1}{2}(2p)$

$\Rightarrow \underline{OA = p}$

b) $OP + PQ = OQ$

$PQ = OQ - OP$

$\underline{PQ = 2q - 2p}$

But $PB = \frac{1}{2} PQ$

$\Rightarrow PB = \frac{1}{2}(2q - 2p)$

$\Rightarrow \underline{PB = q - p}$

c) $AB = AP + PB$

$= p + q - p$

$\Rightarrow \underline{AB = q}$

d) $DR = \frac{1}{2} OR$

$\Rightarrow DR = \frac{1}{2}(2r)$

$\Rightarrow \underline{DR = r}$

e) $RQ = OQ - OR$

$\Rightarrow \underline{RQ = 2q - 2r}$

$RC = \frac{1}{2} RQ$

$= \frac{1}{2}(2q - 2r)$

$\Rightarrow \underline{RC = q - r}$

f) $DC = DR + RC$

$= r + q - r$

$\Rightarrow \underline{DC = q}$

$BQ = \frac{1}{2} PQ$

$= \frac{1}{2}(2q - 2p)$

$\underline{BQ = q - p}$

$CQ = \frac{1}{2} RQ$

$= \frac{1}{2}(2q -$

$\underline{CQ = q - r}$

ii) $AB = DC = q$ it fo[llows] that AB is parallel t[o]

$AD = OD + AO = r - p$

$BC = BQ - CQ = (q - p) - (q - r)$

$= \underline{r - p}$

AD is parallel to BC.

ABCD is a PARALLELOGRAM