$2a\,i)$ $\quad n=(1,1)$, $r_o=(5,7)$ $\qquad \Rightarrow \qquad n_1(x-x_o)+n_2(y-y_o)=0$

$$1\cdot(x-5)+1\cdot(y-7)=0$$

$$x+y-12=0$$

$$\boxed{y=-x+12}$$

$ii)$ $\quad n=(-1,-1)$, $r_o=(5,7)$ $\qquad \Rightarrow \qquad -1\cdot(x-5)+(-1)(y-7)=0$

$$-x+5-y+7=0$$

$$\boxed{y=-x+12}$$

$v)$ In this case n is 4 dimensions & the r_o is only a 2-D vector. If n is going to be a hyper plane in 4D space, r_o would also need to be 4 dimensional.

$vi)$ The pairs have the __same__ simplified expression