Name : _____

Exercise 1 *Let $A, B \in \mathbb{R}^n$, write "Yes" if the statement is correct, "No" if it is not correct.*

   i) $\|A + B\| = \|A\| + \|B\|$:   No, counter example : $A = (1, 0)$, $B = (0, 1)$

                              then $\|A\| = \|B\| = 1$ but $\|A + B\| = \|(1,1)\| = \sqrt{2}$.

   ii) $\|A + B\|^2 \le \|A\|^2 + \|B\|^2$:   No, counter example : $A = (1, 0)$, $B = (1, 0)$

                              then $\|A\| = \|B\| = 1$ but $\|A + B\|^2 = \|(2,0)\|^2 = 4$.

   iii) $A \cdot B = 0$ *implies* $A = 0$ *or* $B = 0$:   No , counter example : $A = (1, 0)$, $B = (0, 1)$.

Exercise 2 *Let $P, P', N, N' \in \mathbb{R}^n$ with $N \neq \mathbf{0}$, $N' \neq \mathbf{0}$ and $P' \neq P$. Circle the letter(s) which correspond(s) to a <u>correct</u> statement : The hyperplanes $H_{P,N}$ and $H_{P',N'}$ are parallel if*

    (a) $P \in H_{P',N}$,   (b) $N = N'$,   (c) $N \cdot N' = 0$,   (d) $\overrightarrow{ON'}$ *is parallel to* $\overrightarrow{ON}$.

Exercise 3 *Answer by "Yes" or "No" : Does the point $X = (1, 0, -1)$ belong to the plane defined by the point $P = (0, 0, 0)$ and the direction $N = (1, 1, 1)$:*   Yes , since $X \cdot N = 0$ and

    $P \cdot N = 0$.

Exercise 4 *Circle the letter which correspond to a <u>correct</u> statement : Do 4 distinct points in $\mathbb{R}^3$ define a plane ?*

          (a) *always,*   (b) *sometimes,*   (c) *never.*

Exercise 5 *Let $A, B, P, Q \in \mathbb{R}^n$. Circle the letter(s) which correspond(s) to a correct statement : The located vectors $\overrightarrow{AB}$ and $\overrightarrow{PQ}$ are equivalent if*

  (a) they have the same length

  (b) they are parallel and have the same direction

  (c) $(B - A) - (Q - P) = 0$

  (d) $(B - A) \cdot (Q - P) = 0$