QUIZ-6

14.1.6: $P(4,5,3)$, $Q(1,7,4)$, $R(2,4,6)$

We just need to show $|PQ| = |PR| = |QR|$

$$|PQ| = \sqrt{(4-1)^2+(5-7)^2+(3-4)^2} = \sqrt{9+4+1} = \sqrt{14}$$

$$|PR| = \sqrt{(4-2)^2+(5-4)^2+(3-6)^2} = \sqrt{14}$$

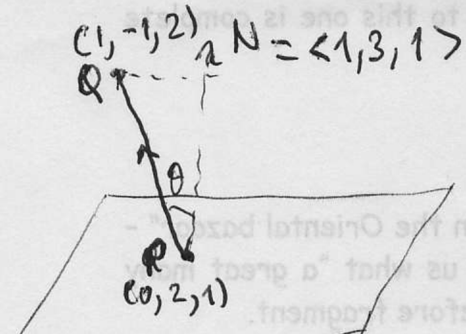
$$|QR| = \sqrt{(1-2)^2+(7-4)^2+(4-6)^2} = \sqrt{14}$$

They all are equal to $\sqrt{14}$. Hence the triangle having R, Q, R as its vertices is a ~~tran~~ equilateral triangle.

14.2.30 Let's find an arbitrary point on the plane:

$x+3y+z=7$; if $x=0$, $y=2$, $z=1$ then $(0,2,1)$ is ~~in~~ on our plane.

We want to find the distance between our plane and $(1,-1,2)$



the vector $\vec{PQ} = \langle 1-0, -1-2, 2-1\rangle = \langle 1, -3, 1\rangle$

Now, if we find the scalar projection of $\vec{PQ}$ to the Normal $\vec{N}$ of the plane then it will be the distance that we are looking for:

$$\left|pr_{\vec{N}}\vec{PQ}\right| = \frac{|\vec{PQ}\cdot\vec{N}|}{|\vec{N}|} = \frac{|1-6+1|}{\sqrt{1+9+1}} = \frac{|-4|}{\sqrt{11}} = \frac{4}{\sqrt{11}}$$