GROUP QUIZ QUESTIONS

(1) Are the following statements true or false:

(a) Two lines in R^3 perpendicular to a third are parallel.

(b) Two lines in $\mathbb{R}^3$ either intersect or are parallel.

(c) For any vectors u, v, w in $\mathbb{R}^3$,

$$u \times (v \times w) = (u \times v) \times w$$

(d) For any vectors u, v in $\mathbb{R}^3$

$$(u \times v).u = 0$$

(e) For any vectors u, v in $\mathbb{R}^3$

$$|u \cdot v| \leq (|u|)(|v|)$$

(2) Find the equation of the plane through the points $(1, 0, 0)$, $(0, 1, 0)$ and $(0, 0, 1)$.

(3) Find the equation of the plane through the point $(1, 2, 1)$ perpendicular to the line

$$x - 1 = \frac{y}{2} = \frac{z - 4}{-3}$$

(4) Find the cosine of the angle between the planes $x+y+z=1$ and $x+2y-z=1$.

(5) Find an equation for the line segment between the points $(1,-1,2)$ and $(-3,7,5)$

(6) A triangle in R^3 is defined by its three vertices, all of which lie in a unique plane. Find the area of a triangle with vertices $(1,0,1)$, $(0,2,3)$ and $(-1,5,-2)$.