Homework I Second-Half

Due in class July 11 2017

0. Read The Following Sections:
Chapter 10. Vectors and the Geometry of Space: Section 10.4 The Cross Product, 10.5 Equations of Lines and Surfaces

1. $\vec{u} =< 1, 2, 4 >$, $\vec{v} =< -2, 1, 3 >$. Compute $\vec{u} \times \vec{v}$.

2. $\vec{u} \cdot \vec{v} = \sqrt{3}$ and $\vec{u} \times \vec{v} =< 1, 2, 2 >$. Compute the angle between $\vec{u}$ and $\vec{v}$.

3. l is a line passing through Q and R. P is a point not on the line l. Show that the distance d from P to l is given by
$$d = \frac{|\overrightarrow{QR} \times \overrightarrow{QP}|}{|\overrightarrow{QR}|}$$

4. Find the volume of the parallelepiped determined by the following vectors:
$$\vec{u} =< 1, 2, 3 >, \vec{v} =< -1, 1, 2 >, \vec{w} =< 2, 1, 4 >$$

5. Find a parametric equation that passes through the points $(1, 2, 3)$ and $(4, 5, 6)$.

6. Find a parametric equation for the line through $(2, 4, 6)$ that is perpendicular to the plane $x - y + 3z = 7$

7. Find symmetric equation for the line that passes through the point $(1, 5, 6)$ and is parallel to the vector $< -1, 2, 3 >$

8. Find an equation of the plane passing through $(1, 2, 3)$ with normal vector $< 0, 1, 4 >$

9. Find an equation of the plane passing through $(0, 2, 4)$, $(1, -3, 2)$ and $(-3, -2, 1)$

10. Find the distance from $(1, 2, 4)$ to the plane $3x + 2y + z - 5 = 0$

11. Find the distance from $(1, 2, 4)$ to the line $\frac{x-1}{3} = \frac{y+2}{4} = \frac{z-2}{12}$

12. Find the equation of the line of intersection l of the planes $x+2y+3z = 1$ and $-x + 2y - 3z = 2$