Math 32 – Workshop #5

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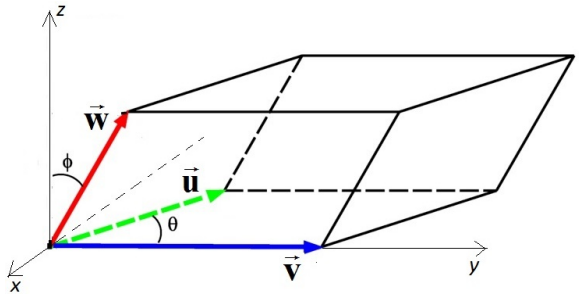
1. The parallelepiped below is formed by the vectors $\vec{\mathbf{u}} = \langle -4, 3, 0\rangle$, $\vec{\mathbf{v}} = \langle 0, 7, 0\rangle$, $\vec{\mathbf{w}} = \langle 0, 1, 3\rangle$, with angles $\theta = \pi/3$ and $\phi = \pi/6$. Find the volume of this parallelepiped without using the triple scalar product.
   (The volume of a parallelepiped (3D figure) can be found by multiplying the area of the base times the height of the figure. The area of the base is the area of the parallelogram, which, like a rectangle, has area the length of its base multiplied by its height. In this problem you will need to use some trigonometry.)



2. We want to find the line L that goes through the points $(-5, 2, 3)$ and $(4, -3, 1)$.

   (a) Pick one of these points and find its position vector. Use this to find the vector equation of the line L.

   (b) Find the parametric equations for the line L.

3. We have the line L_1 which has parametric equations $x = 3 + t$, $y = 1 - t$, $z = 4t$.

   (a) Find four different points on this line.

   (b) Find three vectors which are parallel to this line.

   (c) Find a set of parametric equations that describe this same line, but uses a different point and a different direction vector.

   (d) Find the parametric equations of a line that is different from this line, but parallel *(that is, this line should have no points in common with the original line).*