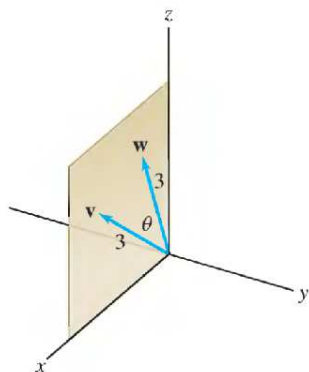


YOUR NAME: \_\_\_\_\_

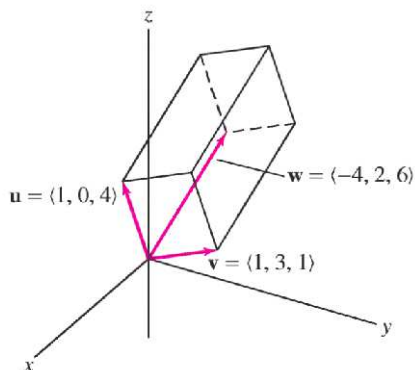
George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. **GOOD LUCK!!**

1. Find  $\mathbf{v} \times \mathbf{w}$ , where  $\mathbf{v}$  and  $\mathbf{w}$  are vectors of length 3 in the  $xz$ -plane, oriented as in the following figure and  $\theta = \frac{\pi}{6}$ .



2. Calculate the volume of the parallelepiped spanned by the vectors  $\mathbf{u}$ ,  $\mathbf{v}$  and  $\mathbf{w}$  shown in the figure below.



3. Find the area of the triangle with vertices  $P = (1, 1, 5)$ ,  $Q = (3, 4, 3)$  and  $R = (1, 5, 7)$ .

