

Math 251 X02  
Test One

Time: 50 minutes  
Total: 25 marks

Name: \_\_\_\_\_

1. [4 marks] Let  $\mathbf{u} = [4, -6]$  and  $\mathbf{v} = [9, 3]$ . Find:

a) the length of  $3\mathbf{u} - 4\mathbf{v}$

b) the angle between  $\mathbf{u}$  and  $\mathbf{v}$

2. [5 marks] Find the general form of the plane that contains the points  $A = (6, -2, 1)$ ,  $B = (7, 3, -1)$  and  $C = (2, -4, 2)$ .

3. [5 marks] Find the volume of the parallelepiped determined by  $\mathbf{u} = [2, -3, 4]$ ,  $\mathbf{v} = [2c, 3, c+1]$ , and  $\mathbf{w} = [9, 8, 7]$ . Simplify your answer. Your answer will involve  $c$ .

4. [5 marks] Find the distance between the plane  $4x + 3y + z = 8$  and the point  $B = (2, 3, -1)$ .

5. [6 marks] Solve using Gauss-Jordan Elimination:

$$\begin{aligned}x - 3y + 8z &= 7 \\2x + 6y + 10z &= 8 \\-3x + 3y - 21z &= -18\end{aligned}$$