

Show all work, be neat.

1. Find the equation of the plane containing the points  $A = (0,1,4)$ ,  $B = (2,5,1)$  and  $C = (-3,0,3)$ .  
5 pts

Two vectors:  $\mathbf{AB} = \langle 2,4,-3 \rangle$  and  $\mathbf{AC} = \langle -3,-1,-1 \rangle$ ,

Cross Product:  $\mathbf{n} = \mathbf{AB} \times \mathbf{AC} = \langle -7,11,10 \rangle$

Plane:  $-7(x - 0) + 11(y - 1) + 10(z - 4) = 0$  or  $-7x + 11y + 10z = 51$

Note that point B or C could be used above. Any correct equivalent answer is acceptable.

2. At what acute angle do the planes  $x - 2y + z = 1$  and  $3x + y - 5z = 6$  intersect? Leave answer in degree form.  
5 pts

The normal vectors are  $n_1 = \langle 1, -2, 1 \rangle$  and  $n_2 = \langle 3, 1, -5 \rangle$ .

The angle between them is  $\theta = \cos^{-1} \left( \frac{n_1 \cdot n_2}{|n_1||n_2|} \right) = \cos^{-1} \left( -\frac{4}{\sqrt{(6)(35)}} \right) = 106.02^\circ$ .

The supplement is the desired answer,  $180 - 106.02 = 73.98^\circ$ .