Math 241 Exam 2 Fall 2001 59

PRINT Your Name:_____

Please write your name on the back of your exam also. You may pick up your exam before our next class. The graded exam will be available outside my office all day on Wednesday, October 3.

There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. CIRCLE your answer. **NO CALCULATORS!**

1. **(There is no partial credit for this problem. Make sure your answer is correct.)** Find the equation of the plane through $(1,7,1)$, $(4,1,1)$, and $(1,1,3)$.

P= Q= R=

$$\vec{PQ} \times \vec{PR} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 3 & -6 & 0 \\ 0 & -6 & 2 \end{vmatrix} = -12\vec{i} - 6\vec{j} - 18\vec{k} = -6(2\vec{i} + \vec{j} + 3\vec{k})$$

The Plane is $2(x-1)+(y-7)+3(z-1)=0$

$2x+y+3z=2+7+3$

$\boxed{2x+y+3z=12}$

✓: at P $2+7+3=12$ ✓

at Q $8+1+3=12$ ✓

at R: $2+1+9=12$ ✓

2. **(There is no partial credit for this problem. Make sure your answer is correct.)** Find the equations of the line through $(4,7,9)$ and $(2,4,6)$.

P= Q=

$\vec{PQ} = -2\vec{i} - 3\vec{j} - 3\vec{k}$

$$\boxed{\frac{x-4}{-2} = \frac{y-7}{-3} = \frac{z-9}{-3}}$$

at P: $0=0=0$ ✓

at Q: $+1=+1=+1$ ✓