Please PRINT your name _____

**No calculators, cell phones, computers, notes, etc.**

Circle your answer. Make your work correct, complete and coherent.

The quiz is worth 5 points. The solutions will be posted on my website later today.

**Quiz 5, September 14, 2020**

**Find the equation of the plane through the points $P=(1,1,-1)$, $Q=(2,0,7)$, and $R=(0,-2,1)$. Check your answer.**

The vector $\overrightarrow{PQ}\times\overrightarrow{PR}$ is perpendicular to the plane. We calculate

$$\overrightarrow{PQ}\times\overrightarrow{PR}=\begin{vmatrix}\vec{i} & \vec{j} & \vec{k}\\ 1 & -1 & 8\\ -1 & -3 & 2\end{vmatrix}=\begin{vmatrix}-1 & 8\\ -3 & 2\end{vmatrix}\vec{i}-\begin{vmatrix}1 & 8\\ -1 & 2\end{vmatrix}\vec{j}+\begin{vmatrix}1 & -1\\ -1 & -3\end{vmatrix}\vec{k}=22\vec{i}-10\vec{j}-4\vec{k}.$$

The plane is $22(x-1)-10(y-1)-4(z+1)=0$. Divide both sides of the equation by 2 to obtain

$$11(x-1)-5(y-1)-2(z+1)=0$$

or

$$\boxed{11x-5y-2z=8}.$$

**Check.**

Plug in $P$: $11(1)-5(1)-2(-1)=8$, ✓
Plug in $Q$: $11(2)-5(0)-2(7)=8$. ✓
Plug in $R$: $11(0)-5(-2)-2(1)=8$. ✓