(15) c)(i) $(\lambda-3)(\lambda+3)-(-5)=\lambda^2-9+5=\lambda^2-4=(\lambda-2)(\lambda+2)=0$

(ii) $\lambda_1=2$ , $\lambda_2=-2$

(iii) for $\lambda_1$: $\begin{bmatrix}-1 & -1\\ 5 & 5\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}=\begin{bmatrix}0\\ 0\end{bmatrix} \rightarrow -x_1-x_2=0 \rightarrow x_1=-x_2$ so $x=\begin{bmatrix}-t\\ t\end{bmatrix}$

for $\lambda_2$: $\begin{bmatrix}-5 & -1\\ 5 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}=\begin{bmatrix}0\\ 0\end{bmatrix} \rightarrow -5x_1-x_2=0 \rightarrow x_1=-\frac{1}{5}x_2$ so $x=\begin{bmatrix}-\frac{1}{5}t\\ t\end{bmatrix}$

(16)

| | |
|---|---|
| $\det(A^{-1}BA)=\det(A^{-1})\det(BA)$ | theorum 2.3.4 |
| $=\det(A^{-1})\det(B)\det(A)$ | theorum 2.3.4 |
| $=\det(A^{-1})\det(A)\det(B)$ | determinants are simply numbers |
| $=\det(A^{-1}A)\det(B)$ | theorum 2.3.4 |
| $=\det(I)\det(B)$ | identity matrix $= A^{-1}A$ |
| $=1\cdot\det(B)$ | $\det(I)=1$ |
| $=\det(B)$ ✓✓ | |