Jacob Leonard

$$\det\left(\begin{bmatrix} I_k & 0 \\ 0 & M_{k,k} \end{bmatrix}\right) = \det(I_k)\det(M_{k,k}) = \det(M_{k,k})$$

$$\det M = \pm \det M_{k,k}$$

b. $M_{m-k,k} = 0$, $M_{k,k} = 2$; $k = 1$

<u>Case:</u> $m = 2$

$$M = \begin{bmatrix} 0 & I_{m-k} \\ M_{k,k} & 0 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 2 & 0 \end{bmatrix} \implies \det M = -2 = \det(-M_{k,k})$$

<u>Case:</u> $m = 3$

$$\det\begin{bmatrix} 0 & I_{m-k} \\ M_{k,k} & 0 \end{bmatrix} = \det\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ \vdots & & \\ 2 & 0 & 0 \end{bmatrix} = 2 \neq \det(-M_{k,k})$$

$\hookrightarrow \det(M) \neq \det(-M_{k,k})$

<u>Case:</u> $K = m/2 \implies$ all submatrices are square and of the same dimension

$\hookrightarrow \det M = \det(-M_{k,k})$

D

D, C, C, C, C, D