

3.3.2 (b)

$$\det(M_{23}) = \begin{vmatrix} 2 & -1 & 3 \\ -1 & 1 & -2 \\ 0 & 2 & 5 \end{vmatrix}$$

↑

$$= 2 \begin{vmatrix} 1 & -2 \\ 2 & 5 \end{vmatrix} - (-1) \begin{vmatrix} -1 & 3 \\ 2 & 5 \end{vmatrix} + 0$$

$$= 2(5 + 4) + 1(-5 - 5)$$

$$= 40 - 10$$

$$= 30$$

3.3.12

$$\begin{vmatrix} t-1 & \overset{b}{0} & 1 \\ -2 & t+2 & -1 \\ 0 & 0 & t+1 \end{vmatrix} = 0$$

$$\Leftrightarrow -0 + (t+2) \begin{vmatrix} t-1 & 1 \\ 0 & t+1 \end{vmatrix} - 0 = 0$$

$$\Leftrightarrow (t+2)(t-1)(t+1) = 0$$

$$\Leftrightarrow t = -2, -1, 1.$$

3.3.13

$$(a) f(t) = \det(tI_2 - A)$$

$$= \det\left(\begin{bmatrix} t & 0 \\ 0 & t \end{bmatrix} - \begin{bmatrix} a & b \\ c & d \end{bmatrix}\right)$$

$$= \det\left(\begin{bmatrix} t-a & -b \\ -c & t-d \end{bmatrix}\right)$$

$$= (t-a)(t-d) - bc$$

$$= t^2 - dt - at + ad - bc$$

$$= t^2 - (a+d)t + (ad - bc)$$

(b) The coefficient of t^2 is 1

(c) The constant term is $\det(A)$!