Weekly HW 005

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0.0.1 3.2.2(f)

Compute the following determinants via reduction to triangular form or by citing a particular theorem or corollary:

$$\begin{bmatrix} 2 & 0 & 1 & 4 \\ 3 & 2 & -4 & -2 \\ 2 & 3 & -1 & 0 \\ 11 & 8 & -4 & 6 \end{bmatrix} \to \begin{bmatrix} 2 & 0 & 1 & 4 \\ 0 & 2 & -\frac{11}{2} & -8 \\ 0 & 3 & -2 & -4 \\ 0 & 8 & -\frac{19}{2} & -16 \end{bmatrix} \to \begin{bmatrix} 2 & 0 & 1 & 4 \\ 0 & 2 & -\frac{11}{2} & -8 \\ 0 & 0 & \frac{25}{4} & 8 \\ 0 & 0 & \frac{25}{2} & 16 \end{bmatrix}$$

$$\to \begin{bmatrix} 2 & 0 & 1 & 4 \\ 0 & 2 & -\frac{11}{2} & -8 \\ 0 & 0 & \frac{25}{4} & 8 \\ 0 & 0 & 0 & 0 \end{bmatrix} \to 2 \times 2 \times \frac{25}{4} \times 0 = \boxed{0}$$

0.0.2 3.2.26(b)

Use Theorem 3.8 to determine all values of t so that the following matrices are nonsingular:

$$\begin{bmatrix} t & 1 & 2 \\ 0 & 1 & 1 \\ 1 & 0 & t \end{bmatrix}$$

$$-t^2 + t + 2 \neq 0$$

$$\boxed{t \neq 1, -1}$$

0.0.3 3.3.12

Find all values of t for which

$$\begin{bmatrix} t-1 & 0 & 1 \\ -2 & t+2 & -1 \\ 0 & 0 & t+1 \end{bmatrix}$$

$$(t-1)(t^2 + 3t + 2) = 0$$

$$\boxed{t = 1, -1, -2}$$