§2.5

Note Title 10/23/2005

\# 4

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix} \qquad \bar{b} = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$\underbrace{\begin{bmatrix} 1 & 0 & 0 \\ 1/2 & 1 & 0 \\ 3/2 & -5 & 1 \end{bmatrix}}_{L} \underbrace{\underbrace{\begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix}}_{U} \underline{x}}_{\bar{y}} = \bar{b} = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$\bar{y} = \begin{bmatrix} 0 \\ -5 \\ -18 \end{bmatrix} \qquad \underline{x} = \begin{bmatrix} -5 \\ 1 \\ 3 \end{bmatrix}$$

#26

$$A = PDP^{-1} \qquad D \text{ diagonal}$$

$$A^2 = PD^2P^{-1} \;; \quad A^k = PD^kP^{-1}$$

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§3.1

#19 p191

#37 p200

#19 $\begin{bmatrix} a & b \\ c & d \end{bmatrix}, \begin{bmatrix} c & d \\ a & b \end{bmatrix}$

row permutation $\Rightarrow$

determinant changes sign.

#37 $AB = \begin{bmatrix} 3 & 0 \\ 4 & 1 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ 5 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 17 & 4 \end{bmatrix}$

$\det A = 3$ $\det AB = 24 = \det A \cdot \det B$

$\det B = 8$

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§4.1 #5, 12

#5 $p(t) = at^2$ is the span of the function (vector!) $q(t) = t^2$; hence this is a subspace of $\mathbb{P}_2$.

#12 $W = \left\{ \begin{bmatrix} s+3t \\ s-t \\ 2s-t \\ 4t \end{bmatrix} ; s,t \text{ real} \right\}$

$$\begin{bmatrix} s+3t \\ s-t \\ 2s-t \\ 4t \end{bmatrix} = s \begin{bmatrix} 1 \\ 1 \\ 2 \\ 0 \end{bmatrix} + t \begin{bmatrix} 3 \\ -1 \\ -1 \\ 4 \end{bmatrix} \equiv s\bar{u} + t\bar{v}$$

so $W = \text{Span}\{\bar{u}, \bar{v}\}$, & hence is a subspace.