WebAssign
CH 3.2 (Homework)

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MA 265 Spring 2013, section 132, Spring 2013
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Current Score : 20 / 20 **Due :** Thursday, January 31 2013 11:40 PM EST

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1. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.002.

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

(a) $\begin{vmatrix} -1 & 0 \\ -3 & 3 \end{vmatrix}$

-3 ✓

(b) $\begin{vmatrix} 4 & 1 & 1 \\ 0 & 2 & 0 \\ 0 & 0 & 5 \end{vmatrix}$

40 ✓

(c) $\begin{vmatrix} 4 & 4 & 2 \\ 2 & 5 & 0 \\ 3 & 0 & 0 \end{vmatrix}$

-30 ✓

(d) $\begin{vmatrix} 4 & -3 & 5 \\ 5 & 2 & 0 \\ 2 & 0 & 4 \end{vmatrix}$

72 ✓

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

-90 ✓

(f) $\begin{vmatrix} 2 & 0 & 1 & 4 \\ 3 & 2 & -4 & -2 \\ 2 & 3 & -1 & 0 \\ 12 & 8 & -4 & 6 \end{vmatrix}$

-34 ✓

2. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.003.

If $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix} = 7$, find

$$\begin{vmatrix} a_1 + 2b_1 - 3c_1 & a_2 + 2b_2 - 3c_2 & a_3 + 2b_3 - 3c_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}.$$

7

3. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.004.

If $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix} = -2$, find

$$\begin{vmatrix} a_1 - \frac{1}{2}a_3 & a_2 & a_3 \\ b_1 - \frac{1}{2}b_3 & b_2 & b_3 \\ c_1 - \frac{1}{2}c_3 & c_2 & c_3 \end{vmatrix}.$$

-2

4. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.007.

Evaluate.

(a) $$\begin{vmatrix} 2 & 0 & -3 & -4 \\ -4 & 3 & 0 & 3 \\ -5 & 4 & -4 & 6 \\ 6 & 3 & 5 & -5 \end{vmatrix}$$

(b) $$\begin{vmatrix} 7 & 0 & 0 & 0 \\ -4 & 9 & 0 & 0 \\ 6 & 3 & 4 & 0 \\ 5 & -5 & -3 & 6 \end{vmatrix}$$

(c) $$\begin{vmatrix} t-4 & -1 & -2 \\ 0 & t-3 & 2 \\ 0 & 0 & t-1 \end{vmatrix}$$

(d) $$\begin{vmatrix} t+1 & 5 \\ 6 & t-4 \end{vmatrix}$$

5. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.023.

If $\det(A) = 2$, find $\det(A^5)$.

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6. 2.85/2.85 points | Previous Answers KolmanLinAlg9 3.2.025.

Theorem 3.8 states:

If A is an $n \times n$ matrix, then A is nonsingular if and only if $\det(A) \neq 0$.

Use Theorem 3.8 to determine if the following matrices are nonsingular.

(a) $\begin{bmatrix} 3 & -7 & -7 \\ 4 & -7 & -7 \\ -6 & -1 & -1 \end{bmatrix}$

- ○ the matrix is nonsingular
- ◉ the matrix is not nonsingular
- ○ impossible to determine

✓

(b) $\begin{bmatrix} 4 & 2 & 0 & 5 \\ -9 & 4 & 1 & 7 \\ 6 & 5 & 2 & 0 \\ 0 & 1 & 2 & -7 \end{bmatrix}$

- ◉ the matrix is nonsingular
- ○ the matrix is not nonsingular
- ○ impossible to determine

✓

7. 2.9/2.9 points | Previous Answers KolmanLinAlg9 3.2.026.

Theorem 3.8 states:

If A is an $n \times n$ matrix, then A is nonsingular if and only if $\det(A) \neq 0$.

Use Theorem 3.8 to determine all values of t so that the following matrices are nonsingular. (Enter your answers as a comma-separated list.)

(a) $\begin{bmatrix} t & 1 & 2 \\ 3 & 4 & 5 \\ 6 & 7 & 8 \end{bmatrix}$

$t \neq$

(b) $\begin{bmatrix} t & 4 & 5 \\ 0 & 1 & 1 \\ 1 & 0 & t \end{bmatrix}$

$t \neq$

(c) $\begin{bmatrix} t & 0 & 0 & 0 \\ 0 & t & 0 & 0 \\ 0 & 1 & t & 0 \\ 1 & 0 & 0 & t \end{bmatrix}$

$t \neq$