CHAPTER 11.4

Determinants of Matrices

Multiple-Choice Old Exam Questions

11 questions • 3 topics • options A–E • two questions per page

Topic 1 | Evaluating Determinants and Using Properties

Evaluating a determinant and using properties of determinants and matrix orders • Questions 1–4

Q **1**

The determinant $\begin{vmatrix} 1 & a & 0 \\ 1 & 0 & b \\ 0 & c & 1 \end{vmatrix}$ is equal to

A) $-a - bc$

B) $-a + bc$

C) $-1 - bc$

D) $a - bc$

E) $a + bc$

Q **2**

If $\begin{vmatrix} 2 & 3 & 4 \\ -1 & 2 & 3 \\ a & 2b & 3c \end{vmatrix} = 3$, then $\begin{vmatrix} 2a & 6c + 10 & 4b + 7 \\ a & 3c & 2b \\ 2 & -6 & -4 \end{vmatrix} =$

A) -6

B) -12

C) 18

D) 10

E) -8

Q
3

If A is a matrix of order 3×3 with $|A| = 4$ and B is a matrix of order 4×4 with $|B| = 3$, then $|2B^{-1}| - \frac{1}{6}|2A| =$

A) 0

B) 24

C) -24

D) 2

E) -2

Q
4

Let A and B be 3×3 matrices. If $|A| = \frac{1}{2}$ and $|B| = \frac{1}{3}$ are the determinants of A and B, then $|2AB| - 2|B^{-1}| =$

A) $-\frac{14}{3}$

B) $\frac{14}{3}$

C) $-\frac{68}{3}$

D) $\frac{1}{3}$

E) $-\frac{1}{3}$

Topic 2 | Minors and Cofactors

Finding minors and cofactors of a matrix, and using them • Questions 5–8

Q **5**

The cofactor of the element x in the matrix $\begin{bmatrix} 2 & -1 & 3 & 0 \\ 4 & 0 & x & 4 \\ 0 & 0 & 1 & -1 \\ -1 & -1 & 2 & 0 \end{bmatrix}$ is

A) 3

B) 0

C) $-3x$

D) -1

E) $-2x$

Q **6**

Given the matrix $\begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 0 \\ 2 & 1 & 1 \end{bmatrix}$, the value of $M_{12} + 2A_{23}$ is

A) 11

B) -5

C) -17

D) 3

E) 10

Q
7

Given the matrix $\begin{bmatrix} -1 & x & x \\ -i & 2 & 1 \\ x & -x & i \end{bmatrix}$, where $i = \sqrt{-1}$, if the minor $M_{12} = 0$, then $x =$

A) 1

B) 0

C) -1

D) 2

E) -2

Q
8

If $A = \begin{bmatrix} 1 & -1 & 0 & 3 \\ 2 & 1 & 3 & -2 \\ 3 & 0 & 1 & 4 \\ 0 & 2 & 0 & -1 \end{bmatrix}$, then the cofactor A_{23} is

A) -7

B) 7

C) -8

D) 10

E) -10

Topic 3 | Equations with Determinants

Solving equations written as determinants, and finding the sum of the solutions • Questions 9–11

Q **9**

The sum of all solutions of $\begin{vmatrix} -x & 1 & x \\ 2 & 0 & 1 \\ 0 & 2 & x \end{vmatrix} = x^2$ is

A) 4

B) -4

C) 5

D) -5

E) 0

Q **10**

The sum of the solutions of the equation $\begin{vmatrix} 1 & -1 & 2 \\ 0 & x & 1 \\ 3 & 2 & x-1 \end{vmatrix} = -17$ is equal to

A) 7

B) -7

C) 12

D) -12

E) -6

Q
11

The sum of all the solutions of $\begin{vmatrix} 0 & x & 2 \\ x-1 & 1 & -1 \\ 1 & 2 & -1 \end{vmatrix} = 2$ is equal to:

A) -2

B) -4

C) 1

D) 4

E) 2

Answer Key

"Original" shows the question number in the source worksheet.

Q	Original	Ans.	Value
1	6	**A**	$-a-bc$
2	2	**A**	-6
3	5	**A**	0
4	11	**A**	$-\frac{14}{3}$
5	3	**A**	3
6	7	**A**	11
7	8	**A**	1
8	10	**A**	-7
9	1	**A**	4
10	4	**A**	7
11	9	**A**	-2