

LESSONS COVERED: **2.2, 2.3, 3.1 and 3.2**

1. For what value of h is the following system consistent?

$$\begin{cases} 5x + y - 2z & = & h \\ -10x - 2y + 4z & = & 7 \end{cases}$$

- A. $h = -7/2$
- B. $h = 0$
- C. $h = 7$
- D. $h = -7$
- E. $h = 7/2$

Correct Answer is **A**

2. Which of the following statements are always TRUE?

- i) Let A be an $n \times n$ matrix, then $\det A = \det A^{-1}$.
- ii) If A and B are $n \times n$ nonsingular matrices, then $A + B$ is nonsingular.
- iii) Let A be $n \times n$ matrix, then $\det 3A = 3 \det A$.

- A. i) only
- B. i) and ii) only
- C. iii) only
- D. ii) and iii) only
- E. None of the above

Correct Answer is **E**

3. For what values of a and b is the following system INCONSISTENT:

$$\begin{cases} x + y + 2z = 1 \\ x + \quad \quad 3z = b + 2 \\ x - y + az = 3 \end{cases}$$

- A. $a \neq 4$ and $b = 0$
- B. $a = 4$ and $b = 0$
- C. $a = 4$ and $b \neq 0$
- D. $a \neq 4$ and $b \neq 0$
- E. None of the above

Correct Answer is C

4. If A is a 4×4 matrix, $B = 2A$ and $\det A = 5$, what is $\det(B^T A^{-1})$?

- A. 2
- B. 16
- C. 50
- D. 400
- E. 10

Correct Answer is B

5. Given that

$$\det \begin{bmatrix} a_1 & a_2 & a_3 & a_4 \\ b_1 & b_2 & b_3 & b_4 \\ c_1 & c_2 & c_3 & c_4 \\ d_1 & d_2 & d_3 & d_4 \end{bmatrix} = 9,$$

what is the determinant of

$$\begin{bmatrix} d_1 & d_2 & d_3 & d_4 \\ b_1 & b_2 & b_3 & b_4 \\ 2b_1 - 3c_1 & 2b_2 - 3c_2 & 2b_3 - 3c_3 & 2b_4 - 3c_4 \\ a_1 & a_2 & a_3 & a_4 \end{bmatrix} ?$$

- A. -9
- B. 9
- C. 54
- D. 27
- E. -27

Correct Answer is D

6. Which of the following statements are always TRUE for an $n \times n$ matrix A with $\det A = -5$?

- i) If $AB = AC$, then $B = C$.
- ii) The system $A\mathbf{x} = \mathbf{0}$ has infinitely many solutions.
- iii) A^2 is nonsingular.

- A. i) only
- B. ii) only
- C. i) and iii) only
- D. ii) and iii) only
- E. i), ii) and iii)

Correct Answer is C