

CHAPTER

4

Syllabus

Q. 5. Let $A = \begin{bmatrix} 200 & 50 \\ 10 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 50 & 40 \\ 2 & 3 \end{bmatrix}$

equal to

(A) 460 (B)

(C) 3000 (D)

Ans. Option (D) is correct.

Explanation:

$$A = \begin{bmatrix} 200 & 50 \\ 10 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 50 & 40 \\ 2 & 3 \end{bmatrix}$$

Explanation: We know that the area of a triangle with vertices $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ is given by

$$\Delta = \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

$$\therefore \Delta = \frac{1}{2} \begin{vmatrix} -3 & 0 & 1 \\ 3 & 0 & 1 \\ 0 & k & 1 \end{vmatrix}$$

[Expanding along the third column]

$$9 = \frac{1}{2} [-3(-k) - 3k]$$

$$\Rightarrow 18 = 3k + 3k$$

$$18 = 6k$$

$$\therefore k = \frac{18}{6} \\ = 3$$

Q. 15. Let A be a non-singular square matrix of order 3×3 . Then $|adj A|$ is equal to

- (A) $|A|$ (B) $|A|^2$
 (C) $|A|^3$ (D) $|A|^4$

Ans. Option (B) is correct.

Explanation: We know that

$$(adj A)A = |A|I = \begin{bmatrix} |A| & 0 & 0 \\ 0 & |A| & 0 \\ 0 & 0 & |A| \end{bmatrix}$$

$$\Rightarrow |(adj A)A| = \begin{vmatrix} |A| & 0 & 0 \\ 0 & |A| & 0 \\ 0 & 0 & |A| \end{vmatrix}$$

$$\Rightarrow |adj A| |A| = |A|^3 \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

$$\Rightarrow |adj A| = |A|^2$$

$$A^{-1} = \frac{1}{|A|} (a_{ji})$$

Hence A is true.

A is a diagonal matrix and kA is a diagonal matrix. Hence R is true.
But R is not the correct explanation of A.

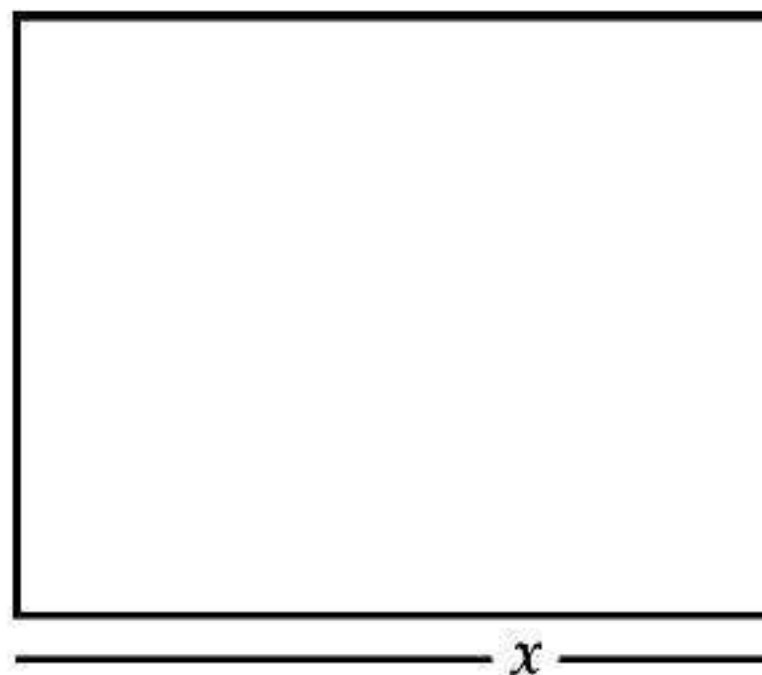
Q. 3. Assertion (A): If every element of a square matrix of order n is multiplied by a scalar k , then the determinant of value Δ is multiplied by k^n .
value of the new determinant is $k^n \Delta$.

Reason (R): If k is a scalar and A is a square matrix of order n , then
 $|kA| = k^n |A|$

Ans. Option (A) is correct.

Explanation: If k is a scalar and A is a square matrix of order n , then

50 m, then its area will remain the same.
 If the length is decreased by 10 m and breadth is increased by 20 m, then its area will decrease by 100 m².



Q. 1. The equations in terms of X and Y are

(A) $x - y = 50, 2x - y = 550$

(B) $x - y = 50, 2x + y = 550$

(C) $x + y = 50, 2x + y = 550$

(D) $x + y = 50, 2x + y = 550$

Ans. Option (B) is correct.



Q.1. $x \mid y \mid z = \underline{\hspace{2cm}}$.

(A) 3

(C) 7

Ans. Option (D) is correct.

Explanation:

$$x + y + z = 12$$

$$2x + 3y + 3z = 33$$

Explanation:

From the above information

$$3x + 2y + z = 1600$$

$$4x + y + 3z = 2300$$

$$x + y + z = 900$$

$$A = \begin{bmatrix} 3 & 2 & 1 \\ 4 & 1 & 3 \\ 1 & 1 & 1 \end{bmatrix}$$

$$\begin{aligned} |A| &= 3(1 - 3) - 2(3 - 1) \\ &= -6 - 2 + 3 \\ &= -5 \end{aligned}$$

$$A^{-1} = \frac{1}{|A|} (\text{adj } A)$$

$$= \frac{1}{-5} \begin{bmatrix} -2 & -1 & 1 \\ 1 & -2 & 3 \\ 3 & -2 & -1 \end{bmatrix}$$