Determinants

Assertion & Reason Type Questions

Directions: In the following questions, each question contains Assertion (A) and Reason (R). Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct. The choices are:

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

c. Assertion (A) is true but Reason (R) is false

d. Assertion (A) is false but Reason (R) is true

Q1. Assertion (A): If a, b, c are distinct and x, y, z are not all zero, given that ax + by + cz = 0, bx + cy + az = 0, cx + ay + bz = 0, then $a + b + c \neq 0$.

Reason (R): $a^2 + b^2 + c^2 > ab + bc + ca$, if a, b and c are distinct.

Answer : (d) Assertion (A) is false but Reason (R) is true

Q2. Assertion (A): The determinant of a matrix

$$\begin{bmatrix} 0 & p-q & p-r \\ q-p & 0 & q-r \\ r-p & r-q & 0 \end{bmatrix} \text{ is zero.}$$

Reason (R): The determinant of a skew-symmetric matrix of odd order is zero.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

Q3. Assertion (A): If A is skew-symmetric matrix of order 3, then its determinant should be zero.

Reason (R): If A is a square matrix, then det A = det A' = det (— A').

Answer : (c) Assertion (A) is true but Reason (R) is false

Q4. Assertion (A): $\Delta = a_{11}A_{11} + a_{12}A_{12} + \alpha_{13}A_{13}$ where, A_{ij} is cofactor of a_{ij}.

Reason (R): Δ = Sum of the products of elements of any row (or column) with their corresponding cofactors.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

Q5. Let A be a 2 × 2 matrix.

Assertion (A): adj (adj A) = A

Reason (R): | adj A | = | A |

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

Q6.

Assertion (A): If $A_r = \begin{bmatrix} r & r-1 \\ r-1 & r \end{bmatrix}$, where r is a natural number, then $|A_1| + |A_2| + \ldots + |A_{2006}| = (2006)^2$.
Reason (R): If A is a matrix of order 3 and $|A| = 2$, then $|\text{adj } A| = 2^2$.

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

Q7.

Assertion (A): The matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 8 \end{bmatrix}$ is singular.

Reason (R): A square matrix A is said to be singular, if $|A| = 0$.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

Q8. Assertion (A): There are only finitely many 2 × 2 matrices which commute with the matrix

$$\begin{bmatrix} 1 & 2 \\ -1 & -1 \end{bmatrix}.$$

Reason (R): If A is non-singular, then it commutes with /, adj A and A^{-1}.

Answer : (d) Assertion (A) is false but Reason (R) is true

Q9.

Assertion (A): The system of equations $2x - y = -2$; $3x + 4y = 3$ has unique solution and $x = -\frac{5}{11}$ and $y = \frac{12}{11}$.

Reason (R): The system of equations $AX = B$ has a unique solution, if $|A| \neq 0$.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

Assertion (A) If $A = \begin{bmatrix} 2 & 1+2i \\ 1-2i & 7 \end{bmatrix}$, then $\det(A)$ is real.

Reason (R) If $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$, a_{ij} being complex numbers, then $|A|$ is always real.

Assertion (A) If $A = \begin{bmatrix} 1 & 2 \\ 5 & -1 \end{bmatrix}$, then $|A| = -11$.

Reason (R) If $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$, then $|A| = a_{11}a_{22} - a_{21}a_{12}$.

Assertion (A) If $\Delta = \begin{vmatrix} 1 & 0 & 1 \\ 1 & -2 & 3 \\ 5 & 3 & 8 \end{vmatrix}$, then $\Delta = -12$.

Reason (R) If we expand the determinant either by any row or by any column, then the value of determinant always be same.

Assertion (A) If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, then $x = \pm 6$.

Reason (R) If A and B are matrices of order 3 and $|A| = 4$, $|B| = 6$, then $|2AB| = 192$.

Assertion (A) Determinant of a skew-symmetric matrix of order 3 is zero.

Reason (R) For any matrix $A, |A^T| = |A|$ and $|-A| = -|A|$.

Assertion (A) The points $A(a, b+c)$, $B(b, c+a)$ and $C(c, a+b)$ are collinear.

Reason (R) Area of a triangle with three collinear points is zero.

Assertion (A) The equation of the line joining $A(1, 3)$ and $B(0, 0)$ is given by $y = 3x$.

Reason (R) The area of triangle with vertices (x_1, y_1), (x_2, y_2) and (x_3, y_3) in the form of determinant is

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

Assertion (A) Minor of an element of a determinant of order $n (n \geq 2)$ is a determinant of order n.

Reason (R) If A is an invertible matrix of order 2, then $\det(A^{-1})$ is equal to $\frac{1}{|A|}$.

Assertion (A) $\Delta = a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$ where, A_{ij} is cofactor of a_{ij}.

Reason (R) $\Delta =$ Sum of the products of elements of any row (or column) with their corresponding cofactors.

Assertion (A) The matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 8 \end{bmatrix}$ is singular.

Reason (R) A square matrix A is said to be singular, if $|A| = 0$.

Assertion (A) If $A = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 1 & -3 \\ 5 & 4 & -9 \end{bmatrix}$, then $|A| = 0$.

Reason (R) $|\text{adj } A| = |A|^{n-1}$, where n is order of matrix.

Let A be 2×2 matrix.

Assertion (A) adj (adj A) $= A$

Reason (R) $|\text{adj } A| = |A|$

Assertion (A) If $A = \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$, then $A^{-1} = \begin{bmatrix} 3 & -2 \\ 4 & 3 \end{bmatrix}$.

Reason (R) If $A = \begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$, then $A^{-1} = \begin{bmatrix} \frac{2}{13} & -\frac{5}{13} \\ \frac{3}{13} & -\frac{1}{13} \end{bmatrix}$.

Assertion (A) If A is a 3×3 non-singular matrix, then $|A^{-1} \text{adj } A| = |A|$.

Reason (R) If A and B both are invertible matrices such that B is inverse of A, then $AB = BA = I$.

Assertion (A) The system of equations $2x - y = -2$; $3x + 4y = 3$ has unique solution and $x = -\frac{5}{11}$ and $y = \frac{12}{11}$.

Reason (R) The system of equations $AX = B$ has a unique solution, if $|A| \neq 0$.

ANS

10. (c) 11. (a) 12. (a)

Given, $A = \begin{bmatrix} 2 & 1+2i \\ 1-2i & 7 \end{bmatrix}$

$\therefore \quad |A| = 14 - (1-2i)(1+2i)$

$= 14 - [1+4] = 14 - 5 = 9$

If $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$, a_{ij} being complex numbers,

then $|A|$ may be real or complex.

Hence, Assertion is true and Reason is false.

We have, $A = \begin{bmatrix} 1 & 2 \\ 5 & -1 \end{bmatrix}$

$\therefore \quad |A| = \begin{vmatrix} 1 & 2 \\ 5 & -1 \end{vmatrix}$

$= 1(-1) - 5(2)$

$= -1 - 10$

$= -11$

Given, $\Delta = \begin{vmatrix} 1 & 0 & 1 \\ 1 & -2 & 3 \\ 5 & 3 & 8 \end{vmatrix}$

$= 1\{-16-9\} + 1\{3+10\}$

$= -25 + 13$

$= -12$ [expanding along R_1]

Assertion $\because \begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$

$\Rightarrow \quad 2x^2 - 40 = 18 + 14$

$\Rightarrow \quad 2x^2 = 32 + 40$

$\Rightarrow \quad x^2 = \frac{72}{2} = 36$

$\therefore \quad x = \pm 6$

Reason We know that, $|AB| = |A| \cdot |B|$

$\therefore \quad |2AB| = 8|AB|$

$= 8|A| \cdot |B|$

$= 8 \times 4 \times 6$

$= 192$

Assertion Determinant of a skew-symmetric matrix of odd order is zero.

$\therefore$ Assertion is true.

Reason For any matrix A, $|A^T| = A$

and $\quad |-A| = |A|$

[when A is of even order]

and $\quad |-A| = -|A|$

[when A is of odd order]

$\therefore$ Reason is false.

We know that, the area of triangle with three collinear points is zero.

Now, consider area of

$\Delta ABC = \frac{1}{2} \begin{vmatrix} a & b+c & 1 \\ b & c+a & 1 \\ c & a+b & 1 \end{vmatrix}$

$= \frac{1}{2} | a\{(c+a) \times 1 - (a+b) \times 1\} - (b+c)\{b \times 1 - 1 \times c\} + 1\{b \times (a+b) - (c+a) \times c\}|$

$= \frac{1}{2} | a(c+a-a-b) - (b+c)(b-c) + 1(ab+b^2-c^2-ac)|$

$= \frac{1}{2} | ac - ab - b^2 + c^2 + ab + b^2 - c^2 - ac|$

$= \frac{1}{2} \times 0 = 0$

Since, area of $\Delta ABC = 0$.

Hence, points $A(a, b+c)$, $B(b, c+a)$ and $C(c, a+b)$ are collinear.

Assertion Let $P(x, y)$ be any point on AB.

Then, area of ΔABP is zero.

[since, the three points are collinear]

$\therefore \quad \frac{1}{2} \begin{vmatrix} 1 & 3 & 1 \\ 0 & 0 & 1 \\ x & y & 1 \end{vmatrix} = 0$

This gives $\frac{1}{2}(3x - y) = 0$

or $\quad y = 3x$

which is the equation of required line AB.

Reason The area of triangle with vertices (x_1, y_1), (x_2, y_2) and (x_3, y_3) is given by

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

Assertion Minor of an element of a determinant of order $n (n \geq 2)$ is a determinant of order $n-1$.

So, Assertion is false.

Reason We know, $AA^{-1} = I$

$\therefore \quad |AA^{-1}| = |I| \Rightarrow |A||A^{-1}| = 1$

$\Rightarrow \quad |A^{-1}| = \frac{1}{|A|}$

So, Reason is true.

By expanding the determinant

$$\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} \text{ along } R_1, \text{ we have}$$

$$\Delta = (-1)^{1+1} a_{11} \begin{vmatrix} a_{22} & a_{23} \\ a_{32} & a_{33} \end{vmatrix} + (-1)^{1+2} a_{12} \begin{vmatrix} a_{21} & a_{23} \\ a_{31} & a_{33} \end{vmatrix} + (-1)^{1+3} a_{13} \begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{32} \end{vmatrix}$$

$= a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$,

where A_{ij} is cofactor of a_{ij}.

= Sum of products of elements of R_1 with their corresponding cofactors

The determinant of the matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 8 \end{bmatrix}$ is

$$|A| = \begin{vmatrix} 1 & 2 \\ 4 & 8 \end{vmatrix} = 8 - 8 = 0$$

Hence, A is a singular matrix.

Assertion The given matrix is

$$A = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 1 & -3 \\ 5 & 4 & -9 \end{bmatrix}$$

Then, $|A| = \begin{vmatrix} 1 & 1 & -2 \\ 2 & 1 & -3 \\ 5 & 4 & -9 \end{vmatrix}$

By expanding along R_1 (first row), we get

$$|A| = 1\begin{vmatrix} 1 & -3 \\ 4 & -9 \end{vmatrix} - 1\begin{vmatrix} 2 & -3 \\ 5 & -9 \end{vmatrix} + (-2)\begin{vmatrix} 2 & 1 \\ 5 & 4 \end{vmatrix}$$

$$= 1(-9+12) - 1(-18+15) - 2(8-5)$$
$$= 1(3) - 1(-3) - 2(3) = 3 + 3 - 6 = 0,$$

which is a true statement.

Reason $|\text{adj}(A)| = |A|^{n-1}$ is a true statement.

Hence, both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

Assertion $\because$ adj (adj A)

$$= |A|^{n-2} A = |A|^{2-2} A \quad [\because n = 2]$$
$$= |A|^0 A = A$$

Reason $|\text{adj } A| = |A|^{n-1} = |A|^{2-1} \quad [\because n = 2]$

$$= |A|$$

Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

Assertion Let $A = \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$.

We have, $|A| = \begin{vmatrix} 2 & -2 \\ 4 & 3 \end{vmatrix} = 6 - (-8) = 14$

Cofactors of $|A|$ are

$A_{11} = 3$, $A_{12} = -4$, $A_{21} = 2$ and $A_{22} = 2$.

$$\therefore \quad \text{adj}(A) = \begin{bmatrix} 3 & -4 \\ 2 & 2 \end{bmatrix}' = \begin{bmatrix} 3 & 2 \\ -4 & 2 \end{bmatrix}$$

$$\text{Now,} \quad A^{-1} = \frac{1}{|A|}(\text{adj } A) = \frac{1}{14}\begin{bmatrix} 3 & 2 \\ -4 & 2 \end{bmatrix}$$

$$\Rightarrow \quad A^{-1} = \begin{bmatrix} \frac{3}{14} & \frac{2}{14} \\ -\frac{4}{14} & \frac{2}{14} \end{bmatrix} = \begin{bmatrix} \frac{3}{14} & \frac{1}{7} \\ -\frac{2}{7} & \frac{1}{7} \end{bmatrix}$$

Reason Let $A = \begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$.

We have, $|A| = \begin{vmatrix} -1 & 5 \\ -3 & 2 \end{vmatrix} = -2 - (-15) = 13$

Now, cofactors of $|A|$ are

$A_{11} = 2$, $A_{12} = 3$, $A_{21} = -5$ and $A_{22} = -1$.

$$\therefore \text{ adj}(A) = \begin{bmatrix} 2 & 3 \\ -5 & -1 \end{bmatrix}' = \begin{bmatrix} 2 & -5 \\ 3 & -1 \end{bmatrix}$$

$$\text{Now,} \quad A^{-1} = \frac{1}{|A|}(\text{adj } A) = \frac{1}{13}\begin{bmatrix} 2 & -5 \\ 3 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} \frac{2}{13} & -\frac{5}{13} \\ \frac{3}{13} & -\frac{1}{13} \end{bmatrix}$$

Assertion $|A^{-1} \text{ adj } A| = |A^{-1}| \cdot |\text{adj } A|$

$$[\because |AB| = |A||B|]$$

$$= |A|^{-1} |\text{adj } A| \quad [\because |A^{-1}| = |A|^{-1}]$$

$$= |A|^{-1} \cdot |A|^2$$

[$\because$ A is a 3×3 non-singular matrix, so $|\text{adj } A| = |A|^2$]

$$= |A|$$

Reason It is a true statement. Hence, both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

The given system can be written as

$$AX = B,$$

where $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $X = \begin{bmatrix} x \\ y \end{bmatrix}$ and $B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$

Here, $|A| = \begin{vmatrix} 2 & -1 \\ 3 & 4 \end{vmatrix} = 2 \times 4 - (-3) = 11 \neq 0$

Thus, A is non-singular.

Therefore, its inverse exists.

Therefore, the given system has a unique solution given by $X = A^{-1} B$.

Now, $\operatorname{adj}(A) = \begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}$

$$\therefore \quad A^{-1} = \frac{1}{|A|}(\operatorname{adj} A) = \frac{1}{11}\begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}$$

Now, $X = A^{-1} B = \frac{1}{11}\begin{bmatrix} 4 & 1 \\ -3 & 2 \end{bmatrix}\begin{bmatrix} -2 \\ 3 \end{bmatrix}$

$$= \frac{1}{11}\begin{bmatrix} -8+3 \\ 6+6 \end{bmatrix} = \frac{1}{11}\begin{bmatrix} -5 \\ 12 \end{bmatrix} = \begin{bmatrix} -\frac{5}{11} \\ \frac{12}{11} \end{bmatrix}$$

$$\Rightarrow \quad \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -\frac{5}{11} \\ \frac{12}{11} \end{bmatrix}$$

Hence, $x = \frac{-5}{11}$ and $y = \frac{12}{11}$

Hence, both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Let A be a 2×2 matrix.

Assertion (A): $adj\,(adj\,A) = A$

Reason (R): $|adj\,A| = |A|$

Ans. Option (B) is correct.

Explanation:

$$adj\,(adj\,A) = |A|^{n-2} A$$

Here $n = 2 \Rightarrow adj\,(adj\,A) = A$

Hence A is true.

$$|adj\,A| = |A|^{n-1}$$

$$n = 2 \Rightarrow |adj\,A| = |A|$$

Hence R is true.

R is not the correct explanation for A.

Assertion (A): If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$, then

$$A^{-1} = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix}.$$

Reason (R): The inverse of an invertible diagonal matrix is a diagonal matrix.

Ans. Option (B) is correct.

Explanation:

$$|A| = 24$$

$$Adj\,A = \begin{bmatrix} 12 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & 6 \end{bmatrix}$$

$$A^{-1} = \frac{1}{|A|}(adj\,A) = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix}$$

Hence A is true.

A is a diagonal matrix and its inverse is also a diagonal matrix. Hence R is true.

But R is not the correct explanation of A.

Assertion (A): If every element of a third order determinant of value Δ is multiplied by 5, then the value of the new determinant is 125Δ.

Reason (R): If k is a scalar and A is an $n \times n$ matrix, then $|kA| = k^n |A|$

Ans. Option (A) is correct.

Explanation: If k is a scalar and A is an $n \times n$ matrix, then $|kA| = k^n |A|$.

This is a property of the determinant. Hence R is true.

Using this property, $|5\Delta| = 5^3 \Delta = 125\Delta$

Hence A is true.

R is the correct explanation of A.

Assertion (A): If the matrix $A = \begin{bmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{bmatrix}$ is singular, then $\lambda = 4$.

Reason (R): If A is a singular matrix, then $|A| = 0$.

Ans. Option (A) is correct.

Explanation: A matrix is said to be singular if

$$|A| = 0.$$

Hence R is true.

$$\begin{vmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{vmatrix} = 0$$

$$\Rightarrow \quad 1(40-40) - 3(20-24) + (\lambda+2)(10-12) = 0$$

$$0 + 12 - 2\lambda - 4 = 0$$

$$\Rightarrow \quad \lambda = 4.$$

Hence A is true.

R is the correct explanation for A.

Given $A = \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$.

Assertion (A): $2A^{-1} = 9I - A$

Reason (R): $A^{-1} = \frac{1}{|A|}(adj\,A)$

Ans. Option (A) is correct.

Explanation: $A^{-1} = \frac{1}{|A|}(adj\,A)$ is true.

Hence R is true

$$|A| = 2,$$

$$A^{-1} = \frac{1}{2}\begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$$

$$\text{LHS} = 2A^{-1} = \begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix},$$

$$\text{RHS} = 9\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$$

$\therefore \quad 2A^{-1} = 9I - A$ is true.

R is the correct explanation for A.

Assertion (A): If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ and $A^{-1} = kA$, then $k = \frac{1}{9}$

Reason (R): $|A^{-1}| = \frac{1}{|A|}$

Ans. Option (D) is correct.

Explanation:

$$|A| = -4 - 15 = -19$$

$$A^{-1} = \frac{-1}{19}\begin{bmatrix} -2 & -3 \\ -5 & 2 \end{bmatrix}$$

$$\Rightarrow \quad \frac{-1}{19}\begin{bmatrix} -2 & -3 \\ -5 & 2 \end{bmatrix} = \begin{bmatrix} 2k & 3k \\ 5k & -2k \end{bmatrix}$$

$$\Rightarrow \quad k = \frac{1}{19}$$

A is false

$|A^{-1}| = \frac{1}{|A|}$ is true.

R is true.

Assertion (A) : Determinant is a number associated with a square matrix.

Reason (R) : Determinant is a square matrix.

Assertion (A) : If $A = \begin{bmatrix} 5 & x & x+1 \\ 2 & & 4 \end{bmatrix}$, then the matrix A is singular if $x = 3$.

Reason (R) : A square matrix is a singular matrix if its determinant is zero.

Assertion (A) : If A is a 3×3 matrix, $|A| \neq 0$ and $|5A| = K|A|$, then the value of $K = 125$.

Reason (R) : If A be any square matrix of order $n \times n$ and k be any scalar then $|KA| = K^n|A|$.

Assertion (A) : If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$ then $x = \pm 6$.

Reason (R) : If A is a skew-symmetric matrix of odd order, then $|A| = 0$.

Answers