1. Let A be any 3×3 invertible matrix. Then which one of the following is not always true?

(1) $adj\,(adj\,(\mathrm{A}))=|A|^2.\ (adj\,(\mathrm{A}))^{-1}$
(2) $adj\,(adj\,(\mathrm{A}))=|A|.\,(adj\,(\mathrm{A}))^{-1}$
(3) $adj\,(adj\,(\mathrm{A}))=|A|\ .\ A$
(4) $adj\,(\mathrm{A})=|A|.\,A^{-1}$

2. Let A be a square matrix of order 3 such that $|A|=\ 5$. Then $|adj\,(adj\,A)|=$

(1) 625
(2) 125
(3) 3025
(4) 325

3. If $A=\begin{bmatrix}2 & -3\\ -4 & 1\end{bmatrix}$, then $\mathrm{Adj}(3A^2+12A)$ is equal to:

(1) $\begin{bmatrix}72 & -84\\ -63 & 51\end{bmatrix}$
(2) $\begin{bmatrix}51 & 63\\ 84 & 72\end{bmatrix}$
(3) $\begin{bmatrix}51 & 84\\ 63 & 72\end{bmatrix}$
(4) $\begin{bmatrix}72 & -63\\ -84 & 51\end{bmatrix}$

4. If A and B are square matrices of order 3 such that $|A|=3$ and $|B|=2$, then the value of $|A^{-1}adjB^{-1}adj(3A^{-1})|$ is equal to

(1) 27
(2) $\frac{27}{4}$
(3) $\frac{1}{108}$
(4) $\frac{1}{4}$

5. If $A=\begin{bmatrix}\cos x & \sin x & 0\\ -\sin x & \cos x & 0\\ 0 & 0 & 1\end{bmatrix}=f(x)$, then $A^{-1}=$_____

(1) $f(-x)$
(2) $f(x)$
(3) $-f(x)$
(4) $-f(-x)$

6. Let A$=\begin{bmatrix}1 & 2\\ -5 & 1\end{bmatrix}$and A^{-1}=$xA+yI$, then the value of x and y are

(1) $x=\frac{-1}{11},\ y=\frac{2}{11}$
(2) $x=\frac{-1}{11},\ y=\frac{-2}{11}$
(3) $x=\frac{1}{11},\ y=\frac{2}{11}$
(4) $x=\frac{1}{11},\ y=\frac{-2}{11}$

7. Let A and B are two non-singular matrices of order 3 such that $A+B=2I$ and $A^{-1}+B^{-1}=3I$, then AB is equal to (where, I is the identity matrix of order 3)

(1) A
(2) B
(3) $\frac{2I}{3}$
(4) $2I$

8. If A and B are two non-singular matrices which commute, then $\left(A(A+B)^{-1}B\right)^{-1}\left(AB\right)$ is equal to

(1) $A+B$
(2) $A^{-1}+B^{-1}$
(3) $A^{-1}+B$
(4) None of these

9. If A, B and C are three square matrices of the same order such that $\mathrm{B}=\mathrm{CAC}^{-1}$, then $\mathrm{CA}^3\mathrm{C}^{-1}$ is equal to -

(1) B
(2) B^2
(3) B^3
(4) B^9

10. Let $\mathrm{Z}=\begin{bmatrix}1 & 1 & 3\\ 5 & 1 & 2\\ 3 & 1 & 0\end{bmatrix}$ and $\mathrm{P}=\begin{bmatrix}1 & 0 & 2\\ 2 & 1 & 0\\ 3 & 0 & 1\end{bmatrix}$. If $\mathrm{Z}=\mathrm{PQ}^{-1}$, where Q is a square matrix of order 3, then the value of $\mathrm{Tr}((\mathrm{adjQ})\mathrm{P})$ is equal to (where $\mathrm{Tr}(\mathrm{A})$ represents the trace of a matrix A i.e. the sum of all the diagonal elements of the matrix A and adjB represents the adjoint matrix of matrix B)

(1) 3
(2) -1
(3) 4
(4) $\frac{6}{5}$