

Homework

Find the determinant of the matrix

1. $\begin{vmatrix} 2 & 1 \\ 3 & 4 \end{vmatrix}$

2. $\begin{vmatrix} 5 & 3 \\ -6 & 3 \end{vmatrix}$

3. $\begin{vmatrix} -7 & 6 \\ \frac{1}{2} & 3 \end{vmatrix}$

4. $\begin{vmatrix} 0 & 8 \\ 0 & 4 \end{vmatrix}$

5. $\begin{vmatrix} \lambda-3 & 2 \\ 4 & \lambda-1 \end{vmatrix}$

6. $\begin{vmatrix} e^{2x} & e^{3x} \\ 2e^{2x} & 3e^{3x} \end{vmatrix}$

7. $\begin{vmatrix} x & \ln x \\ 1 & \frac{1}{x} \end{vmatrix}$

8. $\begin{vmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{vmatrix}$

9. $\begin{vmatrix} \sin \theta & 1 \\ 1 & \sin \theta \end{vmatrix}$

10. $\begin{vmatrix} 1 & 4 & -2 \\ 3 & 2 & 0 \\ -1 & 4 & 3 \end{vmatrix}$

11. $\begin{vmatrix} 1 & 0 & 0 \\ 0 & k & 0 \\ 0 & 0 & 1 \end{vmatrix}$

12. $\begin{vmatrix} 1 & 0 & 0 \\ k & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$

13. $\begin{vmatrix} 2 & 4 & 6 \\ 0 & 3 & 1 \\ 0 & 0 & -5 \end{vmatrix}$

14. $\begin{vmatrix} x & y & -1 \\ 3 & 2 & 0 \\ 1 & 1 & 1 \end{vmatrix}$

15. $\begin{vmatrix} \cos \theta & -r \sin \theta & 0 \\ \sin \theta & r \cos \theta & 0 \\ 0 & 0 & 1 \end{vmatrix}$

16. $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$

17. $\begin{vmatrix} 5 & 3 & 0 & 6 \\ 4 & 6 & 4 & 12 \\ 0 & 2 & -3 & 4 \\ 0 & 1 & -2 & 2 \end{vmatrix}$

Find the values of λ for which the determinant is zero.

18. $\begin{vmatrix} \lambda+2 & 2 \\ 1 & \lambda \end{vmatrix}$

19. $\begin{vmatrix} \lambda & 2 & 0 \\ 0 & \lambda+1 & 2 \\ 0 & 1 & \lambda \end{vmatrix}$

Find **a)** $|A|$ **b)** $|B|$ **c)** AB **d)** $|AB|$. Then verify that $|A| |B| = |AB|$

20. $A = \begin{pmatrix} -2 & 1 \\ 4 & -2 \end{pmatrix}, B = \begin{pmatrix} 1 & 1 \\ 0 & -1 \end{pmatrix}$ 21. $A = \begin{pmatrix} -1 & 2 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}, B = \begin{pmatrix} -1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$

Use the fact that $|cA| = c^n |A|$ to evaluate the determinant of the $n \times n$ matrix

22. $A = \begin{pmatrix} 5 & 15 \\ 10 & -20 \end{pmatrix}$ 23. $A = \begin{pmatrix} -3 & 6 & 9 \\ 6 & 9 & 12 \\ 9 & 12 & 15 \end{pmatrix}$