

11. Which of the following is not correct?

(A) $\begin{vmatrix} a+b & c+d \\ e+f & g+h \end{vmatrix} = \begin{vmatrix} a & c \\ e & g \end{vmatrix} + \begin{vmatrix} b & d \\ f & h \end{vmatrix}$

(B) $|kA| = k^3 |A^T|$, where $A = [a_{ij}]_{3 \times 3}$

(C) If A is a skew-symmetric matrix of odd order, then $|A| = 0$

(D) $|A| = |A^T|$, where $A = [a_{ij}]_{3 \times 3}$

(E) None of these

12. A pair has two children. If one of them is boy, then the probability that other is also a boy is

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

(C) $\frac{1}{3}$ (D) $\frac{4}{3}$

(E) None of these

13. If ${}^n p_r = 840$, ${}^n c_r = 35$, then n is equal to

(A) 1 (B) 3

(C) 5 (D) 7

(E) None of these

14. $\frac{d}{dx} (\log \tan x)$

(A) $2 \sec 2x$ (B) $2 \operatorname{cosec} 2x$

(C) $\sec 2x$ (D) $\operatorname{cosec} 2x$

(E) None of these

15. If $y = \frac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}}$, then $\frac{dy}{dx} =$

(A) $\frac{-8}{(e^{2x} - e^{-2x})^2}$ (B) $\frac{8}{(e^{2x} - e^{-2x})^2}$

(C) $\frac{-4}{(e^{2x} - e^{-2x})^2}$ (D) $\frac{4}{(e^{2x} - e^{-2x})^2}$

(E) None of these

16. If $x = a \sin \theta$ and $y = b \cos \theta$, then $\frac{d^2y}{dx^2}$ is

(A) $\frac{a}{b^2} \sec^2 \theta$ (B) $\frac{-b}{a} \sec^2 \theta$

(C) $\frac{-b}{a^2} \sec^3 \theta$ (D) $\frac{-b^2}{a^2} \sec^2 \theta$

(E) None of these

17. If normal to the curve $y = f(x)$ is parallel to x-axis, then correct statement is

(A) $\frac{dy}{dx} = 0$ (B) $\frac{dy}{dx} = 1$

(C) $\frac{dx}{dy} = 0$ (D) All of these

(E) None of these

18. The tangent to the curve $y = ax^2 + bx$ at $(2, -8)$ is parallel to x-axis. Then

(A) $a = 4, b = -4$ (B) $a = 2, b = -8$

(C) $a = 2, b = -4$ (D) $a = 2, b = -2$

(E) None of these

19. Local maximum value of the function

$\frac{\log x}{x}$ is

(A) e (B) 1

(C) $\frac{1}{e}$ (D) $2e$

(E) None of these

20. $\int \frac{x}{4+x^2} dx$ is equal to:

(A) $\frac{1}{2} \tan^{-1} \left(\frac{x^2}{2} \right)$ (B) $\frac{1}{4} \tan^{-1} \left(\frac{x^2}{2} \right)$

(C) $\frac{1}{4} \tan^{-1} x^2 + x$ (D) $\frac{1}{4} \tan^{-1} \left(\frac{x}{2} \right)$

(E) None of these