1) If $f(x) = x^3 - 3x - 1$,then the function has a local minimum value at the point ……..

(A) (-1 , 1)

(B) (-1 , 3)

(C) (1 , -3)

(D) (1 , -1)

2) $\int \mathrm{e}^{\cot x} \csc^2 x \, \mathrm{d}x =$ …………+ c where c is constant

(A) $-e^{\cot x}$

(B) $e^{\cot x}$

(C) $-e^{\tan x}$

(D) $e^{\tan x}$

3) $\int \ln \sqrt{x}$ dx = ………+ c where c is constant

(A) $\frac{1}{2}\ x\ \ln\frac{e}{x}$

(B) $\frac{1}{2} x \frac{\log x}{\log e}$

(C) $\frac{1}{2} x \frac{\log e}{\log x}$

(D) $\frac{1}{2}\ x\ \ln\frac{x}{e}$

4) The slope of the tangent to the curve y = tan θ, x = cot θ at the point (2 , $\frac{1}{2}$) equals……….

(A) 4

(B) $\frac{-1}{4}$

(C) - 4

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

5) If $\lim_{x \to 0} \frac{e^{2x}+\tan ax-1}{x}$ = 1 ,then a =………

(A) -2

(B) 1

(C) -1

(D) 2

6) If y = f(x) is a function its curve passing through the origin where $\frac{dx}{dy} = \frac{1}{2x+1}$ for all points of the curve, then y =………

(A) $x^2 + 2x$

(B) $x^2 + x$

(C) $\frac{1}{2} x^2 + x$

(D) $x^2 + \frac{1}{2} x$

7) The area of the region bounded by the curve y = $x^2 - 9$ and the straight line $x = 4$ above x-axis equals…… units of area

(A) $\frac{20}{3}$

(B) $\frac{47}{3}$

(C) $\frac{5}{3}$

(D) $\frac{10}{3}$

8) $\int \frac{\cos 2x}{(\sin x - \cos x)^2}$ dx =……..+ c where c is constant

(A) ln |cos$x$ – sin$x$|

(B) –ln |cos$x$ + sin$x$|

(C) –ln |cos$x$ – sin$x$|

(D) ln |cos$x$ + sin$x$|

9) If $x \log_y e = 1$, then $\frac{dy}{dx}$ =………. at $x = 1$

(A) e

(B) 1

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

(D) –e

10) The equation of the tangent to the curve $y = e^x$ at the point (1 , e) is……..

(A) $ey + x = 0$

(B) $y - ex = 0$

(C) $ey - x = 0$

(D) $y + ex = 0$

11) If $0 < a < b < \frac{\pi}{2}$, then $\int_a^b tan^2\, x\, dx + \int_b^a sec^2\, x\, dx$ =………

(A) $b - a$

(B) -1

(C) 1

(D) $a - b$

12) The volume of the solid generated by revolving the region bounded by the curve of the function $y = x^2$ and the straight line $y = x + 2$ a complete revolution about x – axis equals……. units of volume

(A) $\frac{81}{10}\pi$

(B) $\frac{72}{5}\pi$

(C) $\frac{92}{15}\pi$

(D) $\frac{7}{6}\pi$

13) If y = $x \ln x - 3x$, then the minimum value of x + y is …..

(A) -e

(B) -2e

(C) - e^2

(D) -2

14) If $xy - 8 \log e = 0$, then $\frac{d^2y}{dx^2}$ =…….

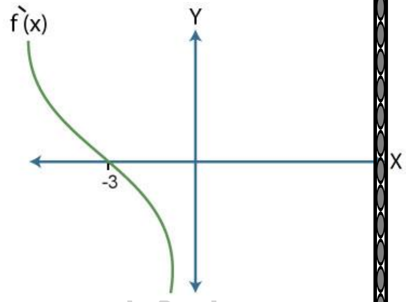
(A) $\frac{-x}{y^2}$

(B) $\frac{2x}{y^2}$

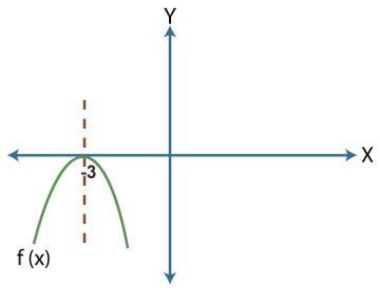
(C) $\frac{-y}{x^2}$

(D) $\frac{2y}{x^2}$

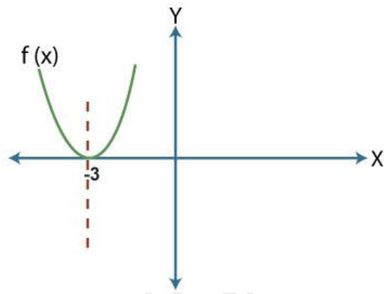
15) If $f^{\backslash}(x)$ is represented by the given figure, then f(*x*) is represented by the figure



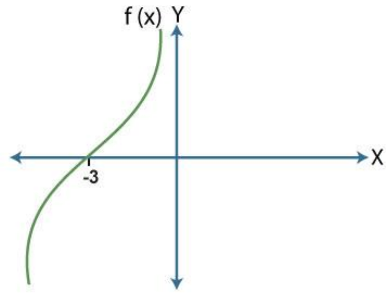
(A)



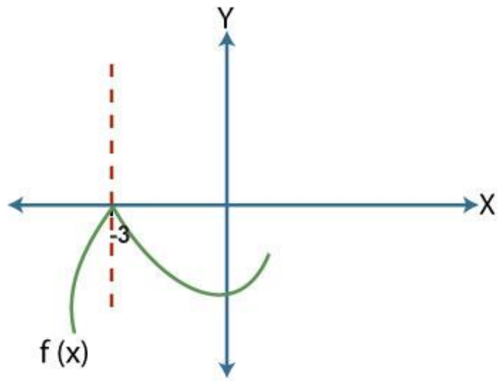
(B)



(C)



(D)



16) The curve of the function y = x e $^{x+k}$ has a point of inflection at x = ….. where k is constant

(A) k

(B) 2

(C) -2

(D) –k

17) If $x = x^{\sec y} - 2$, then $\frac{8}{\sqrt{3}}\frac{dy}{dx}$ =………at the point $(2 , \frac{\pi}{3})$

(A) $-\log_2 e$

(B) $\log_2 e$

(C) –ln2

(D) ln2

18) If the rate of change of the lateral area of a cube at a given moment numerically equals the rate of change of its edge length , then the length of the edge of this cube equals……length units at this moment.

(A) $\frac{1}{16}$

(B) $\frac{1}{8}$

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

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

19) If $f(x) = ax - x^3$ where $x \in [0, 4]$ and f(1) is the absolute maximum value of the function, then find its absolute minimum value of the function where a is constant.

20) The given figure represents the curve $y^2 = 4x$ where $y \geq 0$, and the two straight lines $x = 2y$, $x + y = 3$

Find the area of the shaded region.