SUBJECT: MATHEMATICS
Differentiation Application of differentiation, Definite Integrals

1. The area in square units bounded by the curve $y=x^3$, $y=x^2$ and the ordinates x=1 and x=2 is

   1) 17/12 2) 12/13 3)2/7 4)7/2

2. $\int_0^{\frac{\pi}{2}} \cos x . e^{\sin x}\, dx =$

   1)0 2)1 3)-1 4)e-1

3. The max. value of sin x + cos x is

   1)$\sqrt{2}$ 2)$-\sqrt{2}$ 3) $\sqrt{3}$ 4)2

4. If $y=\tan^{-1}\left[\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right]$ then y^1=

   1)$\frac{1}{\sqrt{1-x^4}}$ 2) $\frac{-1}{\sqrt{1-x^4}}$ 3) $\frac{-x}{\sqrt{1-x^4}}$ 4) $\frac{x}{\sqrt{1-x^4}}$

5. The area of the figure bounded by the curves y=cos x & y=sin x & the ordinates x=0 & x=$\frac{\pi}{2}$ is

   1)$\sqrt{2}-1$ 2) $\sqrt{2}+1$ 3)$\frac{1}{\sqrt{2}}\left[\sqrt{2}-1\right]$ 4)$\frac{1}{\sqrt{2}}$

6. $\int_{-5}^{5}|x+2|dx$ =

   1)15 2)40 3)29 4)10

7. For the curve $y^n=a^{n-1}x$, the subnormal at any point is constant. The value of n must be

   1)2 2)3 3)0 4)1

8. If $y=a\cos[\log x]$, then $x^2y_2+xy_1=$

   1)y 2)-y 3)1 4)-1

9. $\int_0^{\pi} \frac{x\,dx}{1+\sin x}=$

   1)$\frac{\pi}{2}$ 2)π 3)2π 4)none

10. The area of the region bounded by $x=a\cos\theta$, $y=a\sin\theta$ is

    1)$2\pi a^2$ 2)πa^2 3) $2\pi a$ 4) $4\pi a$

11. if $y=1-x+\frac{x^2}{2!}-\frac{x^3}{3!}+----$ then $y_2=$

    1)x 2)-x 3)-y 4)y

12. The max. value of the function $f(x)=x^{\frac{1}{x}}$ is

    1)$\frac{1}{e}$ 2) $\frac{2}{e}$ 3)e 4)$e^{\frac{1}{e}}$

13. $\int_1^3 \frac{\sqrt{4-x}}{\sqrt{x}+\sqrt{4-x}}\, dx =$

1)0 2)2 3)2 4)1

14. The area of region bounded by x=a cosθ &y=b sinθ is

1)2πab 2)πab 3)4πab 4)none

15. The area of region bounded by x=a$\left[\frac{1-t^2}{1+t^2}\right]$ y=a $\left[\frac{2t}{1+t^2}\right]$ is

1)2πa^2 2) πa^2 3)2 πa 4) πa

16. The angle of intersection of y=x[x^2-4] & the x-axis at (2,0) is

1)$\tan^{-1} 8$ 2) $\tan^{-1} 4$ 3) $\tan^{-1} \frac{1}{2}$ 4) none

17. If the tangent at (1,-2) to the curve y=1+ax-x^2 is parallel to x-axis than a=

1)-2 2)2 3)1 4)-1

18. $\int_0^1 log\left[\frac{1}{x}-1\right]$ dx=

1)1 2)0 3)2 4)none

19. If $x=\frac{1-t^2}{1+t^2}$ $y=\frac{2t}{1+t^2}$ then y^1 =

1) - -$\frac{y}{x}$ 2) $\frac{y}{x}$ 3) $-\frac{x}{y}$ 4) $\frac{x}{y}$

20. If 2x + 2y = 2x+y, then the value of $\frac{dx}{dy}$ at x=y=1 is

1)0 2)-1 3)1 4)2

21. $\int_0^1 \frac{\log[1+x]}{1+x^2}\, dx$

1)π/8 2)π/8 log2 3)log 2 4)none

22. On substituting x=sin t, $\int_0^1 \sin^{-1} x dx$ becomes

1)$\int_0^{\frac{\pi}{2}} t\cos t\, dt$ 2) $\int_0^{\frac{\pi}{2}} t\, dt$ 3) $\int_{\frac{\pi}{2}}^0 t\cos t\, dt$ 4)none

23. If 2x2+4xy+3y2=0, theny2=

1)0 2)1/2 3)$\frac{1}{(2x+y)^2}$ 4) 4/3

24. $\int_{-\log 2}^{\log 2} \sin\left[\frac{e^x-1}{e^x+1}\right]$dx =

1)cos(1/3) 2)0 3)2cos2 4)none

25. If $y=\tan^{-1}\frac{\sin x}{1+\cos x}$, then y_1 =

1)3/2 2)1/2 3)2 4)1/3