

21st August, 2017

Maths - Revision Worksheet - 2 - class XII - 2017-18

1) If $f(x) = |\cos x - \sin x|$, find $f'(\pi/3)$ (Ans: $\frac{\sqrt{3}+1}{2}$)

2) If $y = \log\left(\frac{1-x^2}{1+x^2}\right)$, find $\frac{dy}{dx}$ at $x = 1/2$

3) Find $\frac{dy}{dx}$ if $y = x^{\tan x} + \sqrt{\frac{x^2+1}{2}}$

4) Find p & q s.t. $f(x) = \begin{cases} x^2+3x+p, & x \leq 1 \\ qx+2, & x > 1 \end{cases}$
is differentiable at $x=1$ (Ans: $p=3, q=5$)

5) If $x^m y^n = (x+y)^{m+n}$, find $\frac{d^2y}{dx^2}$. (Ans: 0)

6) Using Rolle's theorem, find a point on the curve $y = x(x-4)$, $x \in [0, 4]$ where tangent is parallel to the x -axis.

7) Discuss the applicability of Rolle's Theorem on the function given by:

$f(x) = \begin{cases} x^2+1, & 0 \leq x \leq 1 \\ 3-x, & 1 \leq x \leq 2 \end{cases}$ (Ans: Not applicable)
(as not diffn at $x=1$)

8) If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$, prove that:
 $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$

9) Differentiate (i) $\frac{x}{\sin x}$ w.r.t $\sin x$

(ii) $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ w.r.t $\tan^{-1}x$, $x \neq 0$.

10) If $x = 3\cos\theta - 2\cos^3\theta$, $y = 3\sin\theta - 2\sin^3\theta$,
find $\frac{d^2y}{dx^2}$ at $\theta = \pi/4$.

11) If $y = \sin^{-1}\left(\frac{1}{\sqrt{x+1}}\right)$, find dy/dx (Ans: $-\frac{1}{2\sqrt{x(x+1)}}$)

12) If $y = \frac{8^x}{x^8}$, find dy/dx (Ans: $\frac{8^x}{x^8} (\log 8 - \frac{8}{x})$)

13) If $f(x) = 2^{\cos^2 x}$, find $f'(\pi/4)$ (Ans: $-\sqrt{2} \log 2$)

14) Find the point of discontinuity of $y = f(f(x))$ if $f(x) = \frac{1}{x+2}$.
(Ans: $-5/2$)