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Class – 12th   **Chapter-7**   **Subject Maths**

Worksheet-28   Differentiation

Differentiate the following functions with respect to x

1. (a) $\sin^{-1}\{2x\sqrt{1-x^2}\}, \ -\dfrac{1}{\sqrt{2}} < x < \dfrac{1}{\sqrt{2}}$ (b) $\sin^{-1}(3x - 4x^3) x \in \left(-\dfrac{1}{2}, \dfrac{1}{2}\right)$

2. (a) $\cos^{-1}\left(\dfrac{2x}{1-x^2}\right), \ x \in (-1, 1)$ (b) $\cos^{-1}\left(\dfrac{1-x^2}{1+x^2}\right), \ x \in (0, 1)$

3. (a) $\cos^{-1}(4x^3 - 3x), \ x \in \left(\dfrac{1}{2}, 1\right)$ (b) $\cos^{-1}\left(\sqrt{\dfrac{1+x}{2}}\right)$ (Hint : $x = \cos\theta$)

4. (a) $\sec^{-1}\left(\dfrac{1}{2x^2-1}\right); x \in \left(0, \dfrac{1}{\sqrt{2}}\right)$ (b) $\cos^{-1}\left(\dfrac{1-x^2}{1+x^2}\right), \ x \in (0, \infty)$

5. (a) $\sin^{-1}\left(\dfrac{1+x^2}{1-x^2}\right) + \cos^{-1}\left(\dfrac{1+x^2}{1-x^2}\right)$ (b) $\cos^{-1}(2x) + 2\cos^{-1}\left(\sqrt{1-4x^2}\right)$

     (Hint : $\sin^{-1}\theta + \cos^{-1}\theta = \pi/2$)   (Hint: $2x = \cos\theta$)

6. (a) $\tan^{-1}\left(\dfrac{a+x}{1-ax}\right)$ (Hint : $x = \tan\theta, a = \tan\alpha$)   (b) $\tan^{-1}\left(\dfrac{2^{x+1}}{1-4^x}\right)$ (Hint : $2^x = \tan\theta$)

7. (a) $\sin\left\{2\tan^{-1}\left(\sqrt{\dfrac{1-x}{1+x}}\right)\right\}$ (Hint : $x = \cos\theta$)   (b) $\cot^{-1}\left(\sqrt{1+x^2} + x\right)$ (Hint : $x = \tan\theta$)