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BHASKAR CLASSES PVT LTD

Differentiation

1. Differentiate the following functions with respect to x:
   a. $sin(3x + 5)$
   b. $\tan^2 x$
   c. $tan(x° + 45°)$
   d. $e^{\sin\sqrt{x}}$
   e. $\log\sqrt{\frac{1-cosx}{1+cosx}}$
   f. $\sin^2\{\log(2x + 3\}$
   g. $\log\{x + 2 + \sqrt{x^2 + 4x + 1}\}$
2. If $y = \log\sqrt{\frac{1+tanx}{1-tan\,x}}$, $prove\ that\ \frac{dy}{dx} = sec\ 2x.$
3. Prove that $\frac{d}{dx}\left\{\frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\sin^{-1}\frac{x}{a}\right\} = \sqrt{a^2 - x^2}$.
4. Differentiate the following functions with respect to x:
   a. $\tan^{-1}\left\{\sqrt{\frac{1-cos\,x}{1+cos\,x}}\right\}, -\pi < x < \pi$
   b. $\tan^{-1}(sec\,x + tan\,x)\ , -\frac{\pi}{2} < x < \frac{\pi}{2}$
5. Differentiate the following functions with respect to x:

   $\tan^{-1}\left\{\frac{\sqrt{1+sin\,x}+\sqrt{1-sin\,x}}{\sqrt{1+sin\,x}-\sqrt{1-sin\,x}}\right\}\ , 0 < x < \pi$
6. Differentiate the following functions with respect to x:
   a. $\cos^{-1}\left\{\frac{cos\,x + sin\,x}{\sqrt{2}}\right\}, -\frac{\pi}{4} < x < \frac{\pi}{4}$
   b. $\tan^{-1}\left(\frac{sin\,x}{1+cos\,x}\right), -\pi < x < \pi$
7. If $y = \tan^{-1}\left\{\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right\}, find\ \frac{dy}{dx}$.