

**Differentiation**

1. Differentiate  $\tan^{-1}x$ , with respect to  $x$  from first principal. 3
2. If  $Y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \infty}}}$ , show that  $(2y-1)$  3
3. Find the derivative of  $e^{3x}$  with respect to  $x$ , ab-initio. 3
4. If  $y = ae^{mx} + be^{-mx}$ , prove that  $\frac{d^2y}{dx^2} - m^2y = 0$  3
5. If  $f$  is differentiable at  $x = a$ , find  $\lim_{x \rightarrow a} \frac{x^2f(a) - a^2f(x)}{x - a}$  4
6. Find the derivative of  $\tan^{-1} \left[ \frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right]$  4
7. If  $y = a\cos(\log x) + b\sin(\log x)$ , prove that  $x^2y'' + xy' + y = 0$  4
8. Find  $\frac{dy}{dx}$ , if  $x^y + y^x = a^b$  Where  $a, b$  are constants. 6

For more papers log on to [www.cbsemath.com](http://www.cbsemath.com).

Subscribe to our newsletter for information of latest additions on [cbsemath.com](http://cbsemath.com)