	BCM SCHOOL, BASANT AVENUE, DUGRI ROAD, LUDHIANA Class XII (Continuity and differentiability)
Sol 1.	(a)
2.	(c)
3.	(d)
4.	Take log on both sides, log x = $\frac{x}{y} \Rightarrow$ y $\frac{x}{\log x}$ Now differentiate both sides to get $\frac{dy}{dx} = \frac{logx-1}{(\log x)^2}$.
5.	At x = 3, LHL = RHL 3a + 1 = 3b + 3 ⟹ a − b = 2/3
6.	Let u = $\tan^{-1}\left[\frac{\sqrt{1+x^2}-1}{x}\right]$ By substituting x = tan θ, u = $\frac{1}{2}\tan^{-1} x$ So, $\frac{du}{dx} = \frac{1}{2}.\frac{1}{1+x^2}$ Also, let v = $\tan^{-1} x$ $\frac{dv}{dx}$ = $\frac{1}{1+x^2}$ So, $\frac{du}{dv} = \frac{1}{2}$
7.	Taking log on both sides, 16 log x + 9 log y = 17 log (x^2 + y) Differentiate both sides and simplify to get $\frac{dy}{dx} = \frac{2y}{x}$
8.	On differentiating both sides, we have (x + y$\frac{dy}{dx}$)($\frac{2}{x^2+y^2}$) = $\frac{2}{x^2+y^2}(x\frac{dy}{dx} - y)$ $\frac{dy}{dx} = \frac{-(x+y)}{x-y}$
9.	y = $\sin^{-1}\left(\frac{2x}{1+x^2}\right) + \sec^{-1}\left(\frac{1+x^2}{1-x^2}\right)$, y = $\sin^{-1}\left(\frac{2x}{1+x^2}\right) + \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, Put x = $\tan\theta \Rightarrow \theta = \tan^{-1} x$ y = 4$\theta = 4\tan^{-1} x$ So, $\frac{dy}{dx} = \frac{4}{1+x^2}$
10.	(i) $\frac{dy}{dx} = \frac{-(3x^2+2xy+y^2)}{x^2+2xy+3y^2}$ (ii) Taking log on both sides, $y = \frac{x}{1+\log x} \Rightarrow \frac{dy}{dx} = \frac{\log x}{(1+\log x)^2}$ (iii) sin y = log x + log y $\frac{dy}{dx} = \frac{y}{x(y\cos y - 1)}$ **OR** y = (sin x)^y ⟹ log y = y log(sin x) $\frac{dy}{dx} = \frac{y^2\cot x}{1 - y.\log(\sin x)}$