10.	$x = a(\cos\theta + \theta \sin\theta),\ y = a(\sin\theta - \theta\cos\theta)$
Solution:	Given that $x = a(\cos\theta + \theta \sin\theta)$ and $y = a(\sin\theta - \theta\cos\theta)$ $\therefore \frac{dx}{d\theta} = a\,(-\sin\theta + \sin\theta + \theta\cos\theta)$ and $\frac{dy}{d\theta} = a(\cos\theta - \cos\theta + \theta \sin\theta)$ $\Rightarrow \frac{dx}{d\theta} = a\,\theta\,\cos\theta$ and $\frac{dy}{d\theta} = a\,\theta\,\sin\theta$ Hence, $\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{a\,\theta\,\sin\theta}{a\,\theta\,\cos\theta} = \tan\theta$
11.	If $x = \sqrt{a^{\sin^{-1}t}}$, $y = \sqrt{a^{\cos^{-1}t}}$, show that $\frac{dy}{dx} = -\frac{y}{x}$
Solution:	$x = \sqrt{a^{\sin^{-1}t}}$ Squaring both sides, $x^2 = a^{\sin^{-1}t}$ ...... (1) Differentiating both sides $w.r.t.\ t$: $\therefore\ 2x\frac{dx}{dt} = a^{\sin^{-1}t}.\log a\,.\frac{1}{\sqrt{1-t^2}}$ ...... (3) $y = \sqrt{a^{\cos^{-1}t}}$ Squaring both sides, $y^2 = a^{\cos^{-1}t}$ ...... (2) Differentiating both sides $w.r.t.\ t$: $\therefore\ 2y\frac{dy}{dt} = a^{\cos^{-1}t}.\log a\,.\frac{-1}{\sqrt{1-t^2}}$ .... (4) By (4) ÷ (3), we get $\frac{2y\frac{dy}{dt}}{2x\frac{dx}{dt}} = \frac{a^{\cos^{-1}t}.\log a.\frac{-1}{\sqrt{1-t^2}}}{a^{\sin^{-1}t}.\log a\,.\frac{1}{\sqrt{1-t^2}}}$ $\Rightarrow \frac{y}{x}.\frac{dy}{dx} = \frac{-a^{\cos^{-1}t}}{a^{\sin^{-1}t}}$ $\Rightarrow \frac{y}{x}.\frac{dy}{dx} = -\frac{y^2}{x^2}$ [from (2) and (1)] $\Rightarrow \frac{dy}{dx} = -\frac{y}{x}$ **Proved**