ASSIGNMENT – DIFFERENTIABILITY

	Questions	Answer
1.	$\cos(x+y)=y\sin x$	$\frac{dy}{dx}=-\frac{[y.\cos x+\sin(x+y)]}{[\sin(x+y)+\sin x]}$
2.	$\sqrt{x}+\sqrt{y}=\sqrt{a}$	$\frac{dy}{dx}=-\sqrt{\frac{y}{x}}$
3.	$ax^2+b(x+y)=y$	$\frac{dy}{dx}=\frac{2ax+b}{1-b}$
4.	$y=e^{a\cos^{-1}x}$	$\frac{dy}{dx}=\frac{-a\,e^{a\cos^{-1}x}}{\sqrt{1-x^2}}$
5.	$y=\sin\left(m\sin^{-1}x\right)$	$\frac{dy}{dx}=\frac{m\cos\,(m\sin^{-1}x)}{\sqrt{1-x^2}}$
6.	$y=e^{3x}\sin 4x$	$\frac{dy}{dx}=e^{3x}\left(4\cos 4x+3\sin 4x\right)$
7.	$y=\sqrt{a+\sqrt{a+x}}$	$\frac{dy}{dx}=\frac{1}{4\sqrt{a+\sqrt{a+x}}\sqrt{a+x}}$
8.	$y=\sqrt{4+\sqrt{4+\sqrt{4+x^2}}}$	$\frac{dy}{dx}=\frac{x}{4\sqrt{4+\sqrt{4+\sqrt{4+x^2}}}\sqrt{4+\sqrt{4+x^2}}\sqrt{4+x^2}}$
9.	$y=\frac{x}{\sqrt{a^2-x^2}}$	$\frac{dy}{dx}=\frac{a^2}{\left(a^2-x^2\right)^{\frac{3}{2}}}$
10.	$y=\frac{\sqrt{x+1}+\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}}$	$\frac{dy}{dx}=1+\frac{x}{\sqrt{x^2-1}}$
11.	If $y=\sqrt{\frac{1-x}{1+x}}$	show that $\left(1-x^2\right)\frac{dy}{dx}+y=0$
12.	$y=\tan^{-1}\left(\frac{4\sqrt{x}}{1-4x}\right)$	$\frac{dy}{dx}=\frac{2}{\sqrt{x}\left(1+4x\right)}$
13.	$y=\frac{\sqrt{1-\cos x}}{\sqrt{1+\cos x}}$	$\frac{dy}{dx}=-\cos ecx\left(\cot x-\cos ecx\right)$
14.	$e^{x+y}=xy$	$\frac{dy}{dx}=\frac{y(1-x)}{x(y-1)}$
15.	If $\sin y=x\sin(a+y)$	$\frac{dy}{dx}=\frac{\sin^2(a+y)}{\sin a}$
16.	If $y=\frac{\sin^{-1}x}{\sqrt{1-x^2}}$	prove that $\left(1-x^2\right)\frac{dy}{dx}-xy=1$
17.	If $\sin(xy)+\cos(xy)=1$ and $\tan(xy)\neq 1$	show that $\frac{dy}{dx}=-\frac{y}{x}$
18.	If $x^p.y^q=(x+y)^{p+q}$	show that $\frac{dy}{dx}=\frac{y}{x}$

19.	If $x^y.y^x = 3$	show that $\frac{dy}{dx} = -\left(\frac{\log y + \frac{y}{x}}{\log x + \frac{x}{y}}\right)$
20.	$y = e^x \log \tan 2x$	$\frac{dy}{dx} = e^x\left(4\cos ec4x + \log \tan 2x\right)$
21.	$y = (\cos x)^{\cos x}$	$\frac{dy}{dx} = (\cos x)^{\cos x}\left\{-\sin x\left(1 + \log \cos x\right)\right\}$
22.	$y = \log\left(\frac{\sqrt{1-\cos x}}{\sqrt{1+\cos x}}\right)$	$\frac{dy}{dx} = \cos ecx$
23.	$y = \sqrt{\sin\sqrt{1+x^2}}$	$\frac{dy}{dx} = \frac{x\cos x\sqrt{1+x^2}}{2\sqrt{1+x^2}\sqrt{\sin\sqrt{1+x^2}}}$
24.	$y = \sqrt{\frac{\sec 2x - 1}{\sec 2x + 1}}$	$\frac{dy}{dx} = \sec^2 x$
25.	$y = \sin\sqrt{\sin x + \cos x}$	$\frac{dy}{dx} = \frac{\cos\sqrt{\sin x + \cos x}\left(\cos x - \sin x\right)}{2\sqrt{\sin x + \cos x}}$
26.	$y = \sqrt{\frac{\cos x - \sin x}{\cos x + \sin x}}$	$\frac{dy}{dx} = -\frac{\sec^2\left(\frac{\pi}{4} - x\right)}{2\sqrt{\tan\left(\frac{\pi}{4} - x\right)}}$
27.	$y = \sqrt{\frac{1+\tan x}{1-\tan x}}$	$\frac{dy}{dx} = \frac{\sec^2\left(\frac{\pi}{4} + x\right)}{2\sqrt{\tan\left(\frac{\pi}{4} + x\right)}}$
28.	$y = \frac{\sin^2 x}{1+\cos^2 x}$	$\frac{dy}{dx} = \frac{2\sin 2x}{\left(1+\cos^2 x\right)^2}$
29.	$y = \frac{\sin\sqrt{x}}{\sqrt{x}}$	$\frac{dy}{dx} = \frac{\sqrt{x}\cos\sqrt{x} - \sin\sqrt{x}}{2x^{3/2}}$
30.	$y = \sqrt{1-x^2}\sin^{-1}x + x$	$\frac{dy}{dx} = 2 - \frac{x\sin^{-1}x}{\sqrt{1-x^2}}$
31.	$y = \cos^{-1}\left(\sqrt{\cos x}\right)$	$\frac{dy}{dx} = \frac{1}{2}\sqrt{\sec x + 1}$
32.	$y = \sin^{-1}\left(\frac{x - x^{-1}}{x + x^{-1}}\right)$	$\frac{dy}{dx} = \frac{2}{1+x^2}$
33.	$y = \tan^{-1}\left(\frac{1+x^2}{1-x^2}\right)$	$\frac{dy}{dx} = \frac{2x}{1+x^4}$

If you need to do something, don't wait until later. Do it now.