AP Calculus AB
Trig Derivatives Notes

Name Key

Derivatives Of Trigonometric Functions

$\frac{d}{dx}\sin(x)=\cos(x)$	$\frac{d}{dx}\csc(x)=-\csc(x)\cot(x)$
$\frac{d}{dx}\cos(x)=-\sin(x)$	$\frac{d}{dx}\sec(x)=\sec(x)\tan(x)$
$\frac{d}{dx}\tan(x)=\sec^2(x)$	$\frac{d}{dx}\cot(x)=-\csc^2(x)$

For each equation find $\frac{dy}{dx}$

1. $y=\tan(x)-\sin(x)$

$y'=\sec^2x-\cos x$

2. $y=x^2\sec(x)$

$y'=(2x)\sec x+x^2(\sec x\tan x)$

$y'=x\sec x(2+x\tan x)$

3. $y=\frac{\cos(x)}{1+\sin(x)}$

$y'=\frac{(-\sin x)(1+\sin x)-(\cos x)(\cos x)}{(1+\sin x)^2}$

$y'=\frac{-\sin x-\sin^2x-\cos^2x}{(1+\sin x)^2}$

$y'=\frac{-(\sin x+\sin^2x+\cos^2x)}{(1+\sin x)^2}$

$y'=\frac{-(\sin x+1)}{(1+\sin x)^2}$

$y'=\frac{-1}{(1+\sin x)}$

4. $y=e^x(\sin(x)+x)$

$y'=e^x(\sin x+x)+e^x(\cos x+1)$

$y'=e^x(\sin x+x+\cos x+1)$

5. $y=x^3\cos(x)\sin(x)$

$y'=3x^2(\cos x\sin x)+(x^3)[(+\sin x)(\sin x)+(\cos x)(\cos x)]$

$y'=3x^2\cos x\sin x+x^3[-\sin^2x+\cos^2x]$

$y'=3x^2\cos x\sin x-x^3\sin^2x+x^3\cos^2x$

$y'=x^2(3\cos x\sin x-x\sin^2x+x\cos^2x)$

6. $y=\frac{\csc(x)}{\sqrt{x}}=\frac{\csc x}{x^{1/2}}$

$y'=\frac{(-\csc x\cot x)(x^{1/2})-(\csc x)(\frac{1}{2}x^{-1/2})}{(x^{1/2})^2}$

$y'=\frac{-\csc x(x^{1/2}\cot x+\frac{1}{2x^{1/2}})}{x}$