Calculus I SI Worksheet

Section 3.3 Trig Derivatives

$\frac{d}{dx}\sin(x) = \cos(x)$

$\frac{d}{dx}\cos(x) = -\sin(x)$

$\frac{d}{dx}\tan(x) = \sec^2(x)$

$\frac{d}{dx}\csc(x) = -\csc(x)\cot(x)$

$\frac{d}{dx}\sec(x) = \sec(x)\tan(x)$

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

1. $\frac{d}{dx}\sin(x) + x^2\tan(x) + 3$

$\frac{dy}{dx} = \cos x + 2x\tan x + x^2\sec^2 x$

x^2	$\tan(x)$
$2x$	$\sec^2(x)$

2. $\frac{d}{dx}\cos(x)\sin(x) + \frac{1}{3}x^3$

$\frac{dy}{dx} = -\sin^2 x + \cos^2 x + x^2$

$\cos x$	$\sin x$
$-\sin x$	$\cos x$

3. $\frac{d}{dx}\frac{\sin(x)+1}{\cos(x)}$

$\sin x+1$	$\cos x$
$\cos x$	$-\sin x$

$$\frac{dy}{dx}=\frac{\cos^2 x+\sin^2 x+\sin x}{\cos^2 x}$$

$*\ \cos^2 x+\sin^2 x=1$

$$\frac{dy}{dx}=\frac{1+\sin x}{\cos^2 x}=\boxed{\sec^2(x)+\sec x\tan x}$$

OR

$$\frac{\sin x+1}{\cos x}=\frac{\sin x}{\cos x}+\frac{1}{\cos x}=\tan x+\sec x$$

$$\boxed{\frac{dy}{dx}=\sec^2 x+\sec x\tan x}$$

4. $\frac{d}{dx}x^2-\sin(x)\csc(x)$

$$\frac{dy}{dx}=2x-\csc x\cos x+\sin x\csc x\cot x$$

$\frac{1}{\sin}$ $\quad$ $\frac{\cos}{\sin}=\cot$ $\quad$ $\frac{1}{\sin}$ $\quad$ 1

$\sin x$	$\csc x$
$\cos x$	$-\csc x\cot x$

$$\frac{dy}{dx}=2x-\cot x+\cot x$$

$$\boxed{\frac{dy}{dx}=2x}$$

OR

$$-\sin x\csc x=-\sin x\frac{1}{\sin x}=-1$$

$$\frac{d}{dx}(x^2-1)$$

$$\boxed{\frac{dy}{dx}=2x}$$