Nombre de alumnos: Sili Morelia Pérez Escobedo

Nombre del profesor: Jorge Enrique Albores Aguilar

Nombre del trabajo: Trigonométricas
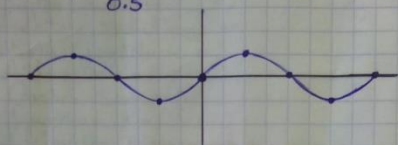
Materia: Calculo

Grado: 4to cuatrimestre

Comitán de Domínguez Chiapas a 25 de noviembre de 2021.

① $f(x) = \operatorname{sen} \frac{1}{2} x$

$A = 1$

$P = \frac{\pi}{0.5} = 4\pi$

② $f(x) = \cos(7-2x)$

- Regla de las funciones trigonométricas
- Regla de la cadena

$\frac{dy}{dx} \cos(7-2x) . \frac{dy}{dx} 7-2x$

$-\operatorname{sen}(7-2)(-2) = \boxed{2\operatorname{sen}(7-2x)}$

③ $f(x) = 3\tan 2x$

$f'(x) = 3\sec^2(2x) . 2$

$f'(x) = \boxed{6\sec^2 2x}$

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④ $f(x) = \sec(5x+2)$

$$\boxed{\frac{d}{dx} \sec v = \sec v . \tan v . v'}$$

$y' = \sec(5x+2) . \tan(5x+2) . (5x+2)$

$y' = \sec(5x+2) . \tan(5x+2) . 5$

$y' = \boxed{5\sec(5x+2)\tan(5x+2)}$

⑤ $f(x) = \sqrt[3]{\operatorname{sen} x}$

$f'(x) = \sqrt{\operatorname{sen} x} \rightarrow$

$\boxed{y' = \frac{\cos x}{2\sqrt{\operatorname{sen} x}}}$

$f = \operatorname{sen} x = f'\cos x$

$Y = \sqrt{f} \rightarrow \frac{y' f'}{2\sqrt{f}}$

⑤ $Y = \sqrt{\operatorname{sen} x}$

$y = \sqrt[2]{(\operatorname{sen} x)^1} = (\operatorname{sen} x)^{\frac{1}{2}} = y = f^a \rightarrow Y = af^{a-1} f'$

$\boxed{\sqrt[n]{f^m} = f^{\frac{m}{n}}}$

$Y = \sqrt[2]{(\operatorname{sen} x)^2} = (\operatorname{sen} x)^{\frac{1}{2}} \rightarrow y^2 = \frac{1}{2}(\operatorname{sen} x)^{\frac{1}{2}-1 = \frac{-1}{2}} . \cos x$

$= \frac{1}{2} . \frac{1}{(\operatorname{sen} x)^{\frac{1}{2}}} . \frac{\cos x}{1}$

$= \frac{\cos x}{2(\operatorname{sen} x)^{\frac{1}{2}}} = \boxed{\frac{\cos x}{2\sqrt{\operatorname{sen} x}}}$

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⑥ $f(x) = \operatorname{sen}^3 3x$

$\boxed{\begin{array}{l} f(x) = U^k \\ f'(x) = kU^{k-1} \end{array}}$

$f(x) = \underbrace{(\operatorname{sen} 3x)^3}_{U}{}^k$

$f(x) = 3(\operatorname{sen} 3x)^{3-1} \underbrace{3\cos 3x}_{U'}$

$\quad\quad\;\; \underset{k}{} \quad \underset{U^{k-1}}{}$

$f'(x) = 3(\operatorname{sen} 3x)^2 3\cos 3x$

$f'(x) = \boxed{9\operatorname{sen}^2 3x \cos 3x}$

⑦ $f(x) = \operatorname{ctg}\underbrace{(3-2x)}_{U}$

$U = 2 - 2x$
$U' = 2$

$f'(x) = \operatorname{ctg} x$

$f'(x) = \csc^2 x$

$f'(x) = -\csc^2(3-2x) . U'$

$f'(x) = -\csc(3-2x)(2)$

$f'(x) = \boxed{-2\cos^2(3-2x)}$

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⑧ $f(x) = \cos\frac{x+1}{x-1}$

$f'(x) = \cos\left(\frac{x+1}{x-1}\right) \underbrace{\frac{d}{dx}\left(\frac{x+1}{x-1}\right)}_{\frac{U}{V}}$

$f'(x) = \cos\left(\frac{x+1}{x-1}\right)\left(\frac{(x-1)(x+1)(x-1)}{(x-1)^2}\right) \quad\quad \frac{d}{dx}\left(\frac{U}{V}\right) = \frac{VU' - UV'}{V^2}$

$f'(x) = \cos\left(\frac{x+1}{x-1}\right)\frac{(x-1)(1)-(x+1)(1)}{(x+1)^2}$

$f'(x) = \cos\left(\frac{x+1}{x-1}\right)\left(\frac{x-1-x-1}{(x-1)^2}\right) = \cos\left(\frac{x+1}{x-1}\right)\left(\frac{-2}{(x-1)^2}\right)$

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