Francisco Javier Gómez Hernandez 23 - 11 - 2021

1: $f(x) = \text{Sen } \frac{1}{2}x$

Desarrollo

- Aplicar formula

$\frac{d}{dx} \text{Sen } V = \cos V \frac{dv}{dx}$

- Derivar V

$v = \frac{1}{2}x \quad dv = \frac{1}{2}$

- Sustituir

$f'(x) = \cos(\frac{1}{2}x) \frac{d}{dx} (\frac{1}{2}x)$

$f'(x) = \cos(\frac{1}{2}x)(\frac{1}{2})$

Resultado

$f'(x) = \frac{\cos(\frac{1}{2}x)}{2}$

2: $f(x) = \cos(7-2x)$

Desarrollo

- Aplicar formula

$\frac{d}{dx} \cos V = -\text{sen } V \frac{dv}{dx}$

- Derivar

$V = 7-2x$

$dv = -2$

Sustituir

$f'(x) = \frac{d}{dx} \cos(7-2x) = -\text{Sen}(7-2x) \frac{d}{dx}(7-2x)$

$f'(x) = (-\text{Sen}(7-2x))$

$f'(x) = (-2)(-\text{Sen}(7-2x))$

Resultado:

$f'(x) = 2 \text{ sen } (7-2x)$

3: $f(x) = 3 \, tg \, 2x$

Desarrollo

- Aplicar formula $\frac{d}{dx} tg V = \sec^2 V \frac{dv}{dx}$

- Derivar

$V = 2x$

$dv = 2$

- Sustituir

$f'(x) = 3\left[\frac{d}{dx} tg(2x)\right] = 3 \sec^2(2x) \frac{d}{dx}(2x)$

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

Resultado

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

4: $f'(x) = \sec(5x+2)$

Desarrollo

- Aplicar formula

$\frac{d}{dx} \sec V = \sec \, tg \, V \frac{dv}{dx}$

- Deriva V

$V = 5x+2 \quad dV = 5$

- Sustituir

$f'(x) = \text{Sec}(5x+2) tg(5x+2) \frac{d}{dx}(5x+2)$

$f'(x) = \text{Sec}(5x+2) tg(5x+2)(5)$

Resultado

$f'(x) 5 \sec(5x+2) tg(5x+2)$

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5.- $f(x) = 3\sqrt{\operatorname{sen} x}$

Desarrollo

- Aplicar $\sqrt[n]{a^m} = a^{m/n}$

$f(x) = (\operatorname{sen} x)^{1/3}$

- Aplicar $\frac{d}{dx} v^n = n v^{n-1} \frac{d}{dx} v$

Derivar v de v^n

$v = \operatorname{sen} x$

- Aplicar $\frac{d}{dx} \operatorname{sen} v = \cos v \frac{d}{dx} v$

$v = x \quad dv = 1$

$dv = \cos x\,(1) = \cos x$

- Sustituir

$f'(x) = \frac{1}{3} (\operatorname{sen} x)^{1/3 - 3/3} \cos x = \frac{1}{3} \cos x\,(\operatorname{sen} x)^{-2/3}$

- Convertir Radical

$f'(x) = \frac{\cos x}{3\,(\operatorname{sen} x)^{2/3}}$ Resultado $f'(x) = \frac{\cos x}{3\sqrt[3]{\operatorname{sen}^2 x}}$

6.- $f(x) = \operatorname{sen}^3 3x$

Desarrollo

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

- Aplicar $\frac{d}{dx} v^n = n v^{n-1} \frac{d}{dx} v$

Derivar v de v^n

$v = \operatorname{sen} 3v$

- Aplicar $\frac{d}{dx} \operatorname{sen} v = \cos v \frac{d}{dx} v$

$v = 3x \quad dv = 3$

$dv = \operatorname{sen} 3x\,(3) = 3\cos(3x)$

- Sustituir

$f'(x) = 3 (\operatorname{sen} 3x)^{3-1} (3\cos(3x)) = 3(3\cos(3x))(\operatorname{sen} 3x)^2$

Resultado

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

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7: $f(x) = \cot(3-2x)$

Aplicar formula $\frac{d}{dx} \cot v = \csc^2 v \frac{d}{dx} v$

- Derivar v

$v = 3-2x \qquad dv = -2$

- Sustituir

$f'(x) = \frac{d}{dx} \cot(3-2x) = \csc^2(3-2x) \frac{d}{dx}(3-2x) = (-\csc^2(3-2x))(-2)$

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

8= $f(x) = \cos \frac{x+1}{x-1}$

Aplicar formula $\frac{d}{dx} \cos v = -\text{sen } v \frac{d}{dx} v$

- Derivar v

$v = \frac{x+1}{x-1}$

Aplicar Cociente de funciones $\frac{d}{dx}\frac{u}{v} = \frac{vdu - udv}{v^2}$

$u = x+1 \qquad v = x-1$

$du = 1 \qquad dv = 1$

Sustituir

$du = \frac{(x-1)(1) - (x+1)(1)}{(x-1)^2} = \frac{x-1-x-1}{(x-1)^2} = \frac{-2}{(x-1)^2}$

Sustituir

$f'(x) = \left[\text{Sen}\left(\frac{x+1}{x-1}\right)\right]\left[\frac{-2}{(x-2)^2}\right] = \frac{2}{(x-1)^2} \text{ Sen}\left(\frac{x+1}{x-1}\right)$

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