Lecture 21 - Inverse Trigonometric Derivatives

Propiedad 1. Las derivadas de las funciones trigonométricas inversas son

$$\frac{\mathrm{d}}{\mathrm{d}x}(\arcsin(x)) = \frac{1}{\sqrt{1-x^2}} \qquad \frac{\mathrm{d}}{\mathrm{d}x}(\arccos(x)) = -\frac{1}{\sqrt{1-x^2}}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}(\arctan(x)) = \frac{1}{\sqrt{1+x^2}} \qquad \frac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arccsc}(x)) = -\frac{1}{|x|\sqrt{x^2-1}}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arcsec}(x)) = \frac{1}{|x|\sqrt{x^2-1}} \qquad \frac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arccot}(x)) = -\frac{1}{1+x^2}$$

Ejemplo 1. Muestre que

1. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arcsin(x)) = \dfrac{1}{\sqrt{1-x^2}}$
2. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arccot}(x)) = -\dfrac{1}{1+x^2}$

Propiedad 2. En general, $\dfrac{\mathrm{d}}{\mathrm{d}x} f^{-1}(x) = \dfrac{1}{f'(y)}$.

Ejemplo 2. Encuentre

1. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arcsin(7x))$
2. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arcsin(x^2))$
3. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arctan(\sqrt{x}))$
4. $\dfrac{\mathrm{d}}{\mathrm{d}x}(x \operatorname{arcsec}(3x^2))$
5. $\dfrac{\mathrm{d}}{\mathrm{d}x}(x \arccos(x) - \sqrt{1-x^2})$
6. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arccsc}(4x-1))$
7. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arcsin(7x))$
8. $\dfrac{\mathrm{d}}{\mathrm{d}x}(\arccos(\dfrac{1}{x}))$

Ejemplo 3. Muestre que $\dfrac{\mathrm{d}}{\mathrm{d}x}(\operatorname{arccsc}(x)) = -\dfrac{1}{|x|\sqrt{x^2-1}}$.