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

- **Derivative of cotangent function**
  $\frac{d}{dx}(\cot x) = -\csc^2 x$
- **Derivative of secant function**
  $\frac{d}{dx}(\sec x) = \sec x \tan x$
- **Derivative of cosecant function**
  $\frac{d}{dx}(\csc x) = -\csc x \cot x$
- **The chain rule**
  $h'(x) = f'(g(x))g'(x)$
- **The power rule for functions**
  $h'(x) = n(g(x))^{n-1} g'(x)$
- **Inverse function theorem**
  $\left(f^{-1}\right)'(x) = \frac{1}{f'\left(f^{-1}(x)\right)}$ whenever $f'\left(f^{-1}(x)\right) \neq 0$ and $f(x)$ is differentiable.
- **Power rule with rational exponents**
  $\frac{d}{dx}\left(x^{m/n}\right) = \frac{m}{n}x^{(m/n)-1}$.
- **Derivative of inverse sine function**
  $\frac{d}{dx}\sin^{-1} x = \frac{1}{\sqrt{1-(x)^2}}$
- **Derivative of inverse cosine function**
  $\frac{d}{dx}\cos^{-1} x = \frac{-1}{\sqrt{1-(x)^2}}$
- **Derivative of inverse tangent function**
  $\frac{d}{dx}\tan^{-1} x = \frac{1}{1+(x)^2}$
- **Derivative of inverse cotangent function**
  $\frac{d}{dx}\cot^{-1} x = \frac{-1}{1+(x)^2}$
- **Derivative of inverse secant function**
  $\frac{d}{dx}\sec^{-1} x = \frac{1}{|x|\sqrt{(x)^2-1}}$
- **Derivative of inverse cosecant function**
  $\frac{d}{dx}\csc^{-1} x = \frac{-1}{|x|\sqrt{(x)^2-1}}$
- **Derivative of the natural exponential function**
  $\frac{d}{dx}\left(e^{g(x)}\right) = e^{g(x)} g'(x)$
- **Derivative of the natural logarithmic function**
  $\frac{d}{dx}(\ln g(x)) = \frac{1}{g(x)}g'(x)$
- **Derivative of the general exponential function**