

### Derivatives of trig functions

$$\checkmark \frac{d}{dx}[\sin x] = \cos x$$

$$\checkmark \frac{d}{dx}[\tan x] = \sec^2 x$$

$$\checkmark \frac{d}{dx}[\sec x] = \sec x \tan x$$

$$\checkmark \frac{d}{dx}[\cos x] = -\sin x$$

$$\checkmark \frac{d}{dx}[\cot x] = -\csc^2 x$$

$$\checkmark \frac{d}{dx}[\csc x] = -\csc x \cot x$$

### Derivatives of inverse trig functions

$$\checkmark \frac{d}{dx}[\sin^{-1} x] = \frac{1}{\sqrt{1-x^2}}$$

$$\checkmark \frac{d}{dx}[\sec^{-1} x] = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\checkmark \frac{d}{dx}[\tan^{-1} x] = \frac{1}{1+x^2}$$

$$\checkmark \frac{d}{dx}[\cos^{-1} x] = -\frac{1}{\sqrt{1-x^2}}$$

$$\checkmark \frac{d}{dx}[\csc^{-1} x] = -\frac{1}{|x|\sqrt{x^2-1}}$$

$$\checkmark \frac{d}{dx}[\cot^{-1} x] = -\frac{1}{1+x^2}$$

### Derivatives of logarithmic and exponential functions

With  $a > 0$  and  $a \neq 1$ :

$$\checkmark \frac{d}{dx}[\ln |x|] = \frac{1}{x}$$

$$\checkmark \frac{d}{dx}[\log_a x] = \frac{1}{x \ln a}$$

$$\checkmark \frac{d}{dx}[e^x] = e^x$$

$$\checkmark \frac{d}{dx}[a^x] = a^x \ln a$$

### Derivatives of inverse functions

$$\checkmark \text{ If } g \text{ is the inverse of } f, \text{ so } f(g(x)) = x = g(f(x)), \text{ then } \frac{d}{dx}[g(x)] = \frac{1}{f'(g(x))}$$