In [1]:
```
import sympy as smp
import math
from IPython.display import display
from IPython.display import Markdown as md
```

In [2]:
```
display(md('../theorems/fundamental_theorem_of_calculus.md'))
display(md('../md/derivatives.md'))
```

Fundamental Theorem Of Calculus:

If f is continuous on $[a, b]$ then the function g defined by:

$$\boxed{g(x) = \int_a^x f(t)\,dt \qquad a \leqslant a \leqslant b}$$

is continuous on $[a, b]$ and differentiable on (a, b), and $g'(x) = f(x)$

Derivatives

Definition of Derivative:

$$\boxed{\frac{d}{dx}(f(x)) = f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}}$$

Derivative Rules:

```{admonition}Constant Rule: :class: note

$$\frac{d}{dx}[c] = 0$$

$$
\begin{gathered}
\frac{d}{dx}32 = 0 \qquad \frac{d}{dx}\pi = 0
\end{gathered}
$$

```{admonition}Power Rule:
:class: note

$$
\begin{aligned}
\frac{d}{dx}[x^n] = nx^{n - 1}
\end{aligned}
$$

$$\frac{d}{dx}n^2 = 2n \qquad \frac{d}{dx}\varphi^3 = 3\varphi^2$$

```{admonition}Product Rule: :class: note
```

$$\frac{d}{dx}[f(x)g(x)] = f'(x)g(x) + f(x)g'(x)$$

```{admonition}Quotient Rule:
:class: note

$$
\begin{aligned}
\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)f^\prime(x) - f(x)g^\pri
me(x)}{\left[g(x)^{-2}\right]}
\end{aligned}
$$
```{admonition}Chain Rule: :class: note

$$\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$$

```
```