



Derivadas e Integrais conceitos básicos



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$$f(x) = x^2$$

DERIVADA

$$f'(x) = ?$$



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$$f(x) = x^2 \quad \text{DERIVADA} \quad f'(x) = ?$$
$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$



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$$f(x + \Delta x) = (x + \Delta x)^2 = x^2 + 2x\Delta x + (\Delta x)^2$$

$$f(x + \Delta x) - f(x) = 2x\Delta x + (\Delta x)^2$$



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$$\frac{f(x + \Delta x) - f(x)}{\Delta x} = 2x + \Delta x$$



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$$\begin{aligned}
 f(x) &= x^2 && \text{DERIVADA} && f'(x) = ? \\
 f'(x) &= \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x} \\
 f(x+\Delta x) &= (x+\Delta x)^2 = x^2 + 2x\Delta x + (\Delta x)^2 \\
 f(x+\Delta x) - f(x) &= 2x\Delta x + (\Delta x)^2 \\
 \frac{f(x+\Delta x) - f(x)}{\Delta x} &= 2x + \Delta x \\
 \lim_{\Delta x \rightarrow 0} (2x + \Delta x) &= 2x \\
 \boxed{f'(x) = 2x}
 \end{aligned}$$



Derivadas e Integrais conceitos básicos

$$f(x) = x^3$$



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$$f(x) = x^3$$

$$\begin{aligned} f(x+\Delta x) &= (x+\Delta x)(x+\Delta x)(x+\Delta x) \\ &= x^3 + 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3 \end{aligned}$$



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$$f(x) = x^3$$

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$$\begin{aligned} \frac{f(x+\Delta x) - f(x)}{\Delta x} &= \frac{3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3}{\Delta x} \\ &= 3x^2 + 3x(\Delta x) + (\Delta x)^2 \end{aligned}$$



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$$= 3x^2 + 3x(\Delta x) + (\Delta x)^2$$

$$\lim_{\Delta x \rightarrow 0} [3x^2 + 3x(\Delta x) + (\Delta x)^2] = 3x^2$$



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$$\begin{aligned} f(x+\Delta x) &= (x+\Delta x)(x+\Delta x)(x+\Delta x) \\ &= x^3 + 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3 \end{aligned}$$

$$\frac{f(x+\Delta x) - f(x)}{\Delta x} = \frac{3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3}{\Delta x}$$

$$= 3x^2 + 3x(\Delta x) + (\Delta x)^2$$

$$\lim_{\Delta x \rightarrow 0} [3x^2 + 3x(\Delta x) + (\Delta x)^2] = 3x^2$$

$$\boxed{f'(x) = 3x^2}$$



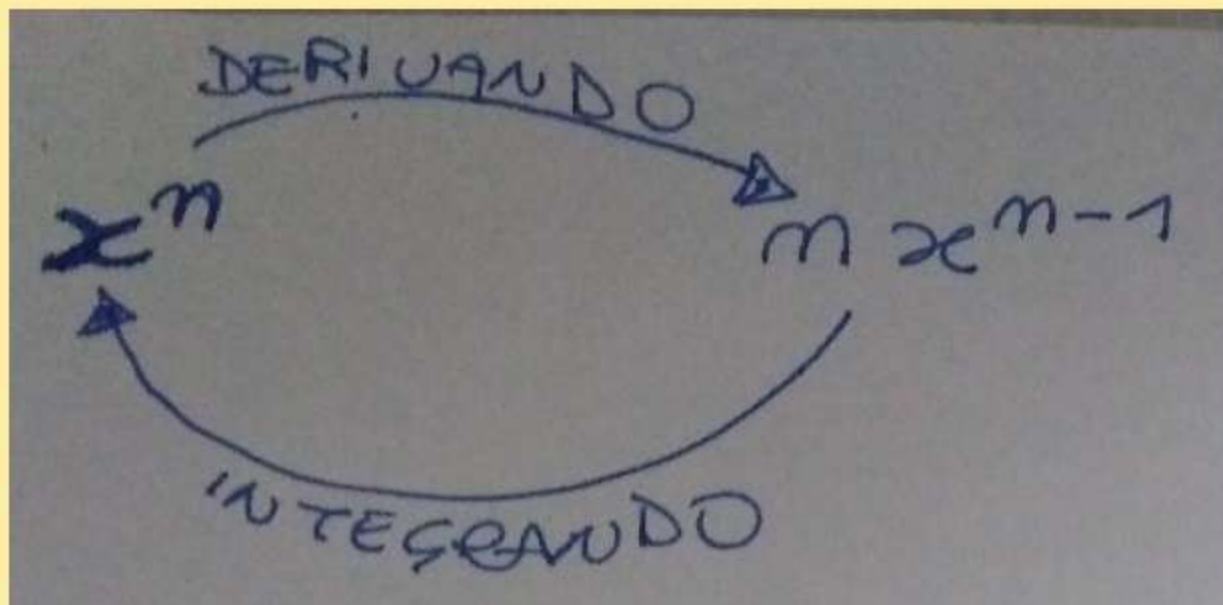
Derivadas e Integrais conceitos básicos

DERIVANDO

$$x^n \rightarrow n x^{n-1}$$



Derivadas e Integrais conceitos básicos





Derivadas e Integrais conceitos básicos

1) Quando usaremos as derivadas?

2) Quando usaremos as integrais?



Derivadas e Integrais conceitos básicos

1) Quando usaremos as derivadas?

Determinar máximos, mínimos,
ângulos das retas tangentes

2) Quando usaremos as integrais?



Derivadas e Integrais conceitos básicos

1) Quando usaremos as derivadas?

Determinar máximos, mínimos,
ângulos das retas tangentes

2) Quando usaremos as integrais?

Calcular áreas