#ادعم_كيلاني

كيلانيات pro

Derivative

a	zero
x	1
ax	a
x^n	nx^{n-1}
ax^n	anx^{n-1}
$(F(x))^n$	$n(F(x))^{n-1} \times F'(x)$
$\sqrt[n]{F(x)}$	$\frac{1}{n} \times (F(x))^{\frac{1}{n}-1} \times F'(x)$

e^x	e^x
$e^{F(x)}$	$F'(x)e^x$
e^a	zero
$\ln F(x)$	$\frac{F'(x)}{F(x)}$
$\ln x$	$\frac{1}{x}$
$\log_a F(x)$	$\frac{F'(x)}{\ln a\, F(x)}$
a^x	$a^x \ln a$
$a^{F(x)}$	$a^x \ln a \times F'(x)$

$\sin F(x)$	$\cos F(x) \times F'(x)$
$\cos F(x)$	$-\sin F(x) \times F'(x)$
$\tan F(x)$	$\sec^2 F(x) \times F'(x)$
$\sec F(x)$	$\sec F(x) \times \tan F(x) \times F'(x)$
$\csc F(x)$	$-\csc F(x) \times \cot F(x) \times F'(x)$
$\cot F(x)$	$-\csc^2 F(x)$

Kelaneyat in Derivative

$\sqrt{F(x)}$	$\frac{F'(x)}{2\sqrt{F(x)}}$
$\frac{a}{x}$	$\frac{-a}{x^2}$
$\frac{1}{x}$	$\frac{-1}{x^2}$
$\frac{x}{a}$	$\frac{1}{a}$
$\sin\frac{\pi}{4}$	zero
$\sin\frac{\pi}{4}x$	$\frac{\pi}{4}\cos\frac{\pi}{4}x$
$(\sin\frac{\pi}{4})x$	$\sin\frac{\pi}{4}$

Ln & Log probabilities

- $\ln e = 1$
- $\ln 1 = \text{zero}$
- $\ln\frac{x}{y} = \ln x - \ln y$
- $\ln xy = \ln x + \ln y$
- $\ln x^n = n \ln x$
- $e^{\ln F(x)} = F(x)$
- $\log_a a = 1$
- $\log_a 1 = \text{zero}$
- $\log_a x^n = n \log_a x$
- $\log_a xy = \log_a x + \log_a y$
- $\log\frac{x}{y} = \log x - \log y$
- $\log_x y = \frac{\log_a x}{\log_a y} = \frac{\ln x}{\ln y}$
- $\log_x y = \frac{1}{\log_y x}$
- $a^{\log F(x)} = F(x)$

Integration

$\int a$	$ax + c$
$\int x$	$\frac{1}{2}x^2 + c$
$\int ax$	$\frac{a}{2}x^2 + c$
$\int x^n$	$\frac{1}{n+1}x^{n+1} + c$
$\int ax^n$	$\frac{a}{n+1}x^{n+1} + c$
$\int e^x$	$e^x + c$
$\int e^{ax}$	$\frac{1}{a}e^{ax} + c$
$\int e^a$	$e^a x + c$
$\int a^x$	$a^x \frac{1}{\ln a} + c$
$\int a^{F(x)} \cdot F'(x)$	$a^{F(x)} \frac{1}{\ln a} + c$
$\int \sin F(x)$	$-\cos F(x) + c$
$\int \cos F(x)$	$\sin F(x) + c$
$\int \sec^2 F(x)$	$\tan F(x) + c$
$\int -\csc^2 F(x)$	$\cot F(x) + c$
$\int \sec F(x) \tan F(x)$	$\sec F(x) + c$
$\int -\csc F(x) \cot F(x)$	$\csc F(x) + c$
$\int \sec F(x)$	$\ln\lvert\sec F(x) + \tan F(x)\rvert + c$
$\int \csc F(x)$	$-\ln\lvert\cot F(x) + \csc F(x)\rvert + c$
$\int \cot F(x)$	$\ln\lvert\sin F(x)\rvert + c$ $-\ln\lvert\csc F(x)\rvert + c$
$\int \tan F(x)$	$\ln\lvert\sec F(x)\rvert + c$ $-\ln\lvert\cos F(x)\rvert + c$

Definite integration

- $\int_a^b F(x)\,dx = -\int_a^b F(x)\,dx$
- $\int_a^a F(x)\,dx = \text{zero}$
- $\int_a^b F(x)\,dx = \int_{-b}^{-a} F(x)\,dx$ — even
- $\frac{d}{dx}\int_a^b F(x)\,dx = \text{zero}$ — constant
- $\int_{-a}^{a} F(x)\,dx = 2\int_0^a F(x)\,dx$ — even
- $\int_{-a}^{a} F(x)\,dx = \text{zero}$ — odd
- $\int_a^b F(x)\,dx = -\int_{-b}^{-a} F(x)\,dx$ — odd

Kelaneyat in integration

$\int \frac{1}{x}$	$\ln F(x) + c$
$\int \frac{F'(x)}{F(x)}$	$\ln x + c$
$\int \frac{d}{dx}F(x)\,dx$	$F(x) + c$
$\frac{d}{dx}\int F(x)\,dx$	$F(x) + c$
$\int dx$	$x + c$

يارب فك الديقة

Simplify

- $\sin^2 x + \cos^2 x = 1$
  - $1 - \cos^2 x = \sin^2 x$
  - $1 - \sin^2 x = \cos^2 x$
- $1 + \tan^2 x = \sec^2 x$
  - $\sec^2 x - 1 = \tan^2 x$
  - $\sec^2 x - \tan^2 x = 1$
- $1 + \cot^2 x = \csc^2 x$
  - $\csc^2 x - 1 = \cot^2 x$
  - $\csc^2 x - \cot^2 x = 1$

$$\frac{2\cot x}{\cot^2 x - 1} = 2\tan 2x$$

$\sin 2x = 2\sin x \cos x$

$\tan 2x = \frac{2\tan x}{1 - \tan^2 x}$

$\cos 2x =$
- $\cos^2 x - \sin^2 x$
- $2\cos^2 x - 1$
- $1 - 2\sin^2 x$

- $\sin^2 x = \frac{1}{2} - \frac{1}{2}\cos 2x$
- $\cos^2 x = \frac{1}{2} + \frac{1}{2}\cos 2x$

$\sin(A+B) = \sin A \cos B + \cos A \sin B$

$\cos(A+B) = \cos A \cos B - \sin A \sin B$

$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

$\tan(45 \pm B) = \frac{1 \pm \tan B}{1 \mp \tan B}$

Behavior of Function

Domain:	كل الـ values اللي ممكن تعوض بيها في الـ (x) ويطلع ليك value للـ (y)
Critical point:	النقطة اللي بيتحول عندها الـ curve من ⊕ إلى ⊖ والعكس
local maximum:	النقطة اللي بيتحول عندها الـ curve من ⊕ إلى ⊖
local minimum:	النقطة اللي بيتحول عندها الـ curve من ⊖ إلى ⊕
absolute maximum:	أعلى نقطة على الـ curve
absolute minimum:	أقل نقطة على الـ curve
Inflection point:	النقطة اللي بتنقل بين الـ convex up & convex down
Convexity:	Convex down ∪ Convex up ∩

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How to get Critical point

- Get the domain
- Get $F'(x)$
- make $F'(x) = \text{zero}$
- Get values of x at which $F'(x) = \text{zero}$ $\frac{1}{0}$
- Substitute in the Original Function to get Critical points $(x, F(x))$

How to get local max or min

- Get Critical point
- No. line لتعوض في الـ $F'(x)$ و تكتب على الـ

local max	local min
$-\infty$ ++ | -- ∞	$-\infty$ -- | ++ ∞
$F'(x)$	$F'(x)$

How to get inflection point

- Get the domain
- Get $F''(x)$
- Make $F''(x) = \text{zero}$
- Get values of x at which $F''(x) = \text{zero}$ $\frac{1}{0}$

Substitute in the original function $F''(x)$
- > 0 Convex down
- < 0 Convex up

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