Please write an outline of the main contents of the lecture.

function f continuous on $[a, b]$

The definite integral:

$$F(x) = \int_a^x f(t)\,dt \qquad x \in [a, b]$$

Fund. theorem of Calculus

$$\frac{dF}{dx} = \frac{d}{dx}\int_a^x f(t)\,dt = f(x)$$

- Every cont. f has F (antiderivatives)
- continuous between derivatives

Application: Simplify complex integral

$$\frac{d}{dx}\left(\int_{\pi}^{x} \left(\frac{\cos^2 t}{\ln(t-\sqrt{t})}\right) dt\right) = \frac{\cos^2 x}{\ln(x-\sqrt{x})}$$

5/19/2015
11AM
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Uniform Distribution

$X \sim \text{Unif}(a, b)$

PDF: $f_x(x) = \frac{1}{b-a}, \quad a \le x \le b$

CDF: $F(x) = \begin{cases} 0 & x < a \\ \frac{x-a}{b-a} & a \le x \le b \\ 1 & x > b \end{cases}$

(Moment generating func.)

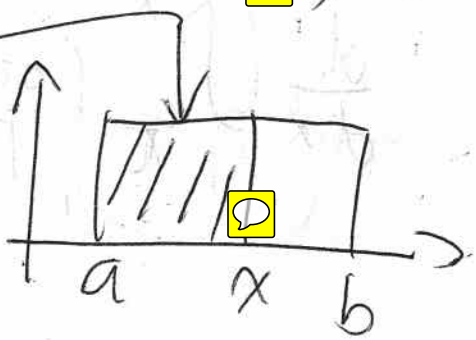
MGF: $M_x(t) = \frac{e^{bt} - e^{at}}{(b-a)t}$

Derv. of $F_x(x) = P(X \le x)$

when $x < a$

$F_x(x) = P(X < x) = 0$

$x \in [a, b)$



$F_x(x) = \int_{-\infty}^{x} f(x)\,dx = \int_a^x \frac{1}{b-a}\,du = \frac{x-a}{b-a}$

$x \ge b$

$F_x(b) = \frac{b-a}{b-a} = 1$

Please write an outline of the main contents of the lecture.

Proof using $e^{ix} = \cos(x) + i\sin(x)$

First proof $\sin^2(x) + \cos^2(x) = 1$

Euler's formula: $e^{ix} = \cos + i\sin x$

$$e^{ix} \cdot e^{-ix} = 1$$

$$\| $$

$$\cos^2(x) + \sin^2(x)$$

Next Proof: ~~$e^{ia} = \cos a + i\sin a$~~

Angle sum formula

$\cos(a+b) = \ldots$

$\sin(a+b) = \ldots$

$e^{ia} = \cos a + i\sin a$

$e^{ib} = \cos b + i\sin b$

$e^{ia} \cdot e^{ib} = e^{i(a+b)}$

$\Rightarrow \cos(a+b) = \cos a\cos b - \sin a\sin b$

$\sin(a+b) = \cos a\sin b - \sin a\sin b$

@ ~~cos(~~