6:30 - 7:50 HUMN 1B50

6:30 ——— ECES 116 1%

13 Mult. Choice × 3 pts each 39%

- 3 code
- 10 other
  - basic defns
  - med.
  - hard

3 Free response × 20 each. 60%

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① Pinned Piazza

no 2

② $\beta^3 - \alpha^3 = (\beta - \alpha)(\beta^2 + 2\alpha\beta + \alpha^2)$

Calc: yes. No phones.

2-sided page of notes.

1. Quadratic $ax^2 + bx + c$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

yes know this.

2. Basic Integration.

$$\int_a^b x^2 \, dx = \left. \frac{x^3}{3} \right|_a^b \checkmark$$

Discrete RVs	Continuous RVs
- discrete outcomes	- continuous outcomes
• finite # of outcomes	• uncountably infinite # of outcomes.
✓ $Ber(p)$	$U[\alpha, \beta]$
✓ $Bin(n, p)$	PDF
$P(X=\pi) = \frac{1}{\pi}$ $P(x=e) = 1-\frac{1}{\pi}$	- integrals
• infinite (countable) # of outcomes.	**Both:**
$Geo(p)$	• CDF cumulative distribution function
PMF	
- sums	

$$\underset{\text{particular \#}}{CDF(a)} = P(\underset{\text{R.V.}}{X} \le a)$$

Both:

- Uniform distribution
  - continuous

PDF $f(x) = \begin{cases} \dfrac{1}{\beta - \alpha} & \alpha \le x \le b \\ 0 & \text{otherwise} \end{cases}$

PMF $f(x) = \dfrac{1}{n}$ n is # of points or outcomes.

$k = \dfrac{1}{6}$

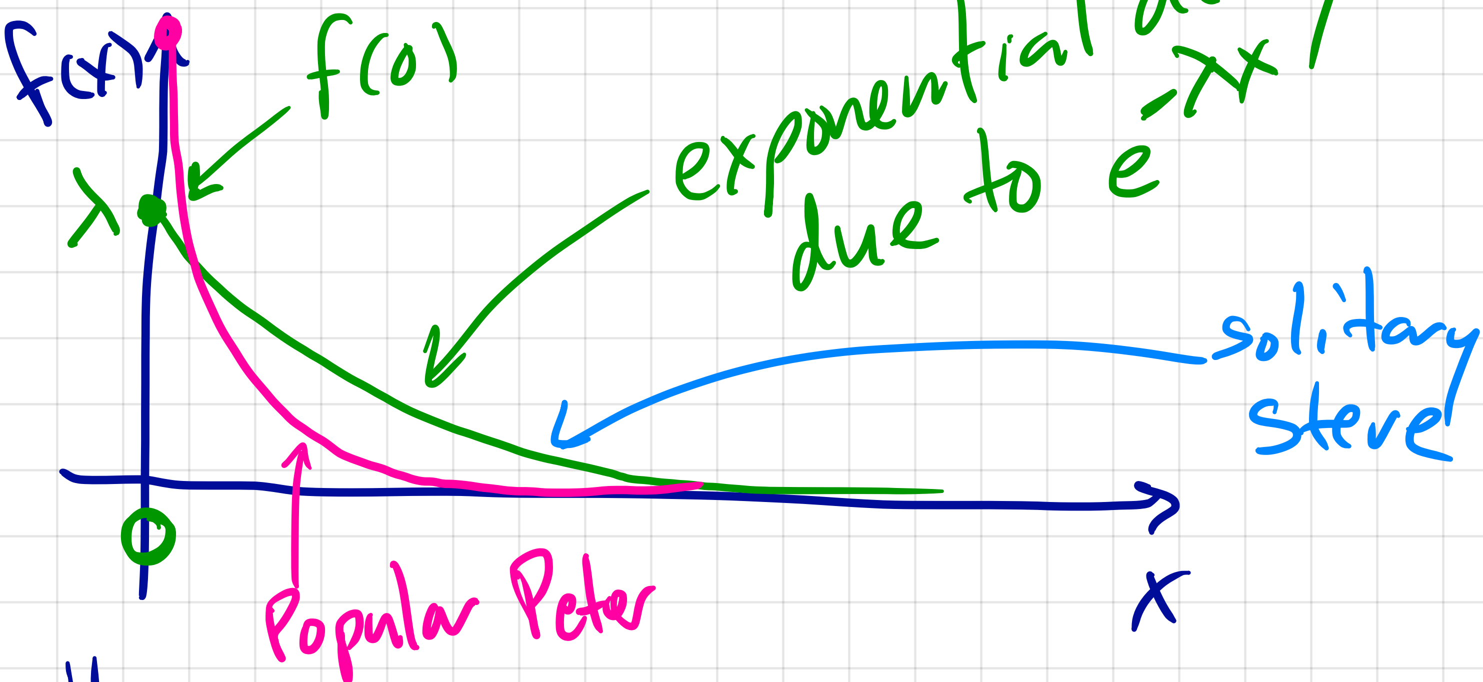
- $E[X]$, $Var(X) = E[X^2] - E[X]^2$

$\sum_{\text{outcomes } i} a_i \, p(a_i)$, $\int_{-\infty}^{\infty} x f(x)\, dx$

Exponential Distribution

PDF: $\lambda e^{-\lambda x}$

$X \sim Exp(\lambda)$



"Opposite of Poisson"

Poisson and Exponential Cousins

Discrete

↓

# of texts in some time period.

Continuous

↓

Inter-arrival time of texts.

What is the typical or expected waiting time for your 1st text?

Assume you get, on average, 10 texts per hour.

Waiting times $\sim Exp(10)$

In python, exponential$(1/10)$

$$E[Exp(10)] = \int_0^\infty x \lambda e^{-\lambda x} dx = \boxed{\frac{1}{\lambda}}$$

integ. by parts! :-

What is the probability that you wait between 30 and 60 minutes for that 1st text?

$\rightarrow$ convert rate to mins: $\frac{1}{6}$ texts per min

or $\rightarrow$ convert times to hrs.

30 to 60 mins $\rightarrow$ $\frac{1}{2}$ to 1 hrs.

$$\int_{1/2}^{1} \lambda e^{-\lambda x}\,dx = \int_{1/2}^{1} 10\, e^{-10x}\,dx$$

$$= 10\int_{1/2}^{1} e^{-10x}\,dx = \cancel{10}\,\frac{e^{-10x}}{-\cancel{10}}\Bigg|_{x=1/2}^{x=1}$$

antideriv.

$$\frac{e^{-10x}}{-10}$$

$$= -1\left(e^{-10\cdot 1} - e^{-10\cdot\frac{1}{2}}\right)$$

$$= \boxed{e^{-5} - e^{-10}}$$