Spring 2020 Welcome

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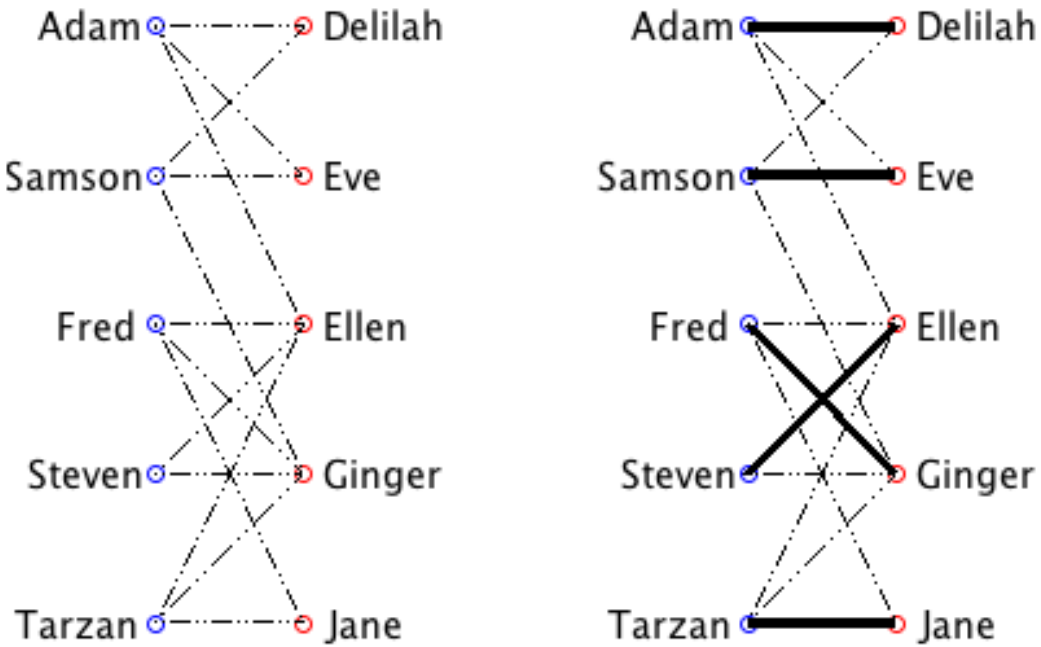
Talking Points

Eligibility/ALEKS – Unstable Marriages
Email – Stable Marriages
Accommodations – Shapley and Gale
Grade Distributions – The Wife Picking Problem.

Assignment Problems and Matching



Unstable if Eve prefers Adam to Samson and Adam prefers Eve to Delilah.

ALEKS

"First Time in College" students in MAC1105 (and 1114, 1140, 2233 and 2311) are required to take aleks. And they must use the FSU Summer 19 – Spring 20 cohort.
Pathway students are not considered FTC - all new spring 20 students are pathway students.
Students with dual enrolled credit, even with AAs are sometimes considered FTC.
Not all college courses are equivalent. They need ALEKS for its *inventory of math skills*. And because it provides a *way to improve any weakness* it finds.
NOT a way to jump, avoid repeating, avoid trig

Stable Matchings

Men	Women
A: XYZ	X: BCA
B: YZX	Y: CAY
C: ZXY	Z: ABC

AX, BY, CZ	Men's first choices, Women's last
AY, BZ, CX	everyone's second choice
AZ, BX, CY	Women's first choices, Men's last

Email

Advisors (other than Jennifer, Elizabeth or Casey) are not your friend

- Do not reply to email from students wanting to add your class, just forward them to advisor@math.fsu.edu

Gale Shapley Algorithm (1962)

repeat

Men propose to their favorite among women that haven't rejected them

Woman says "maybe" to her favorte proposer and rejects the rest

until there are no rejections (and everyone is promised)

Women "jilt" old favorites.

Picks the best stable matching for men, worst stable matching for women.

Nobel prize in 2012 (50 years later) for Shapley

Accommodations

- The letter (emailed) isn't the request. It is a basis for discussion.
- Extra time, only at the SDRC
- Notetaker, send email to class, asking them to directly contact the SDRC.
- Anything else for TAs, should be run through either Kirby or Bellenot.
- Immediate requests are not reasonable.

Wife Picking

W

Wave equation, 575, 711
Weierstrass, Karl (1815–1897),
217, 386
test for uniform convergence, 676
Wife-picking problem, 661 (6)
Work, 615
and kinetic energy, 624 (8)
Wronski (*also* Höené-Wronski)
Josef Maria (1778–1853):
Wronskian, 799–800, 802 (8)

Indes (p 924): University Mathematics, R. C. James, 1963

Page 661, Problem 6

6. A bag contains n balls, no two of which are the same size and the sizes of which are unknown. The balls are drawn from the bag one at a time. Suppose you wish to choose the largest ball, but must make the choice when the ball is drawn and before seeing the next ball. All that is known is the sizes of the balls that have been drawn. It can be shown that the best strategy is to pick a certain integer p, let the first p balls pass, and then pick the first ball that is larger than any of the first p balls. Show that the following are true.

(a) If $j > p$, then the probability the jth ball is the largest and is picked is equal to

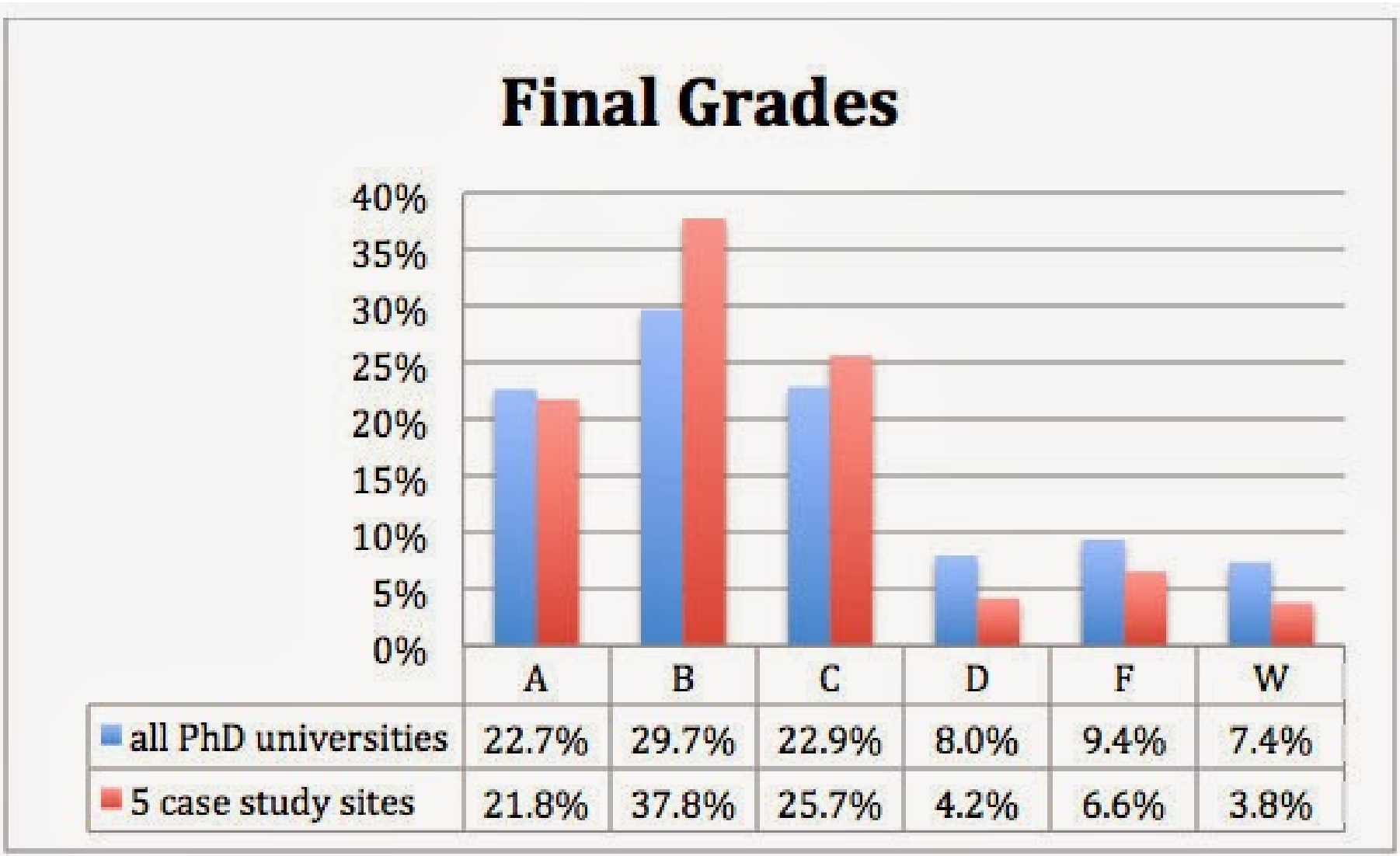
$$\frac{1}{n}\frac{p}{j-1}.$$

(b) The probability the largest ball is picked is equal to

$$\frac{p}{n}\left[\sum_{p+1}^{n}\frac{1}{j-1}\right].$$

Grade Distributions

http://www.maa.org/CSPCC



	A	B	C	D	F	W
all PhD universities	22.7%	29.7%	22.9%	8.0%	9.4%	7.4%
5 case study sites	21.8%	37.8%	25.7%	4.2%	6.6%	3.8%

Figure 1: Instructor reported final grades.

Integral Estimate

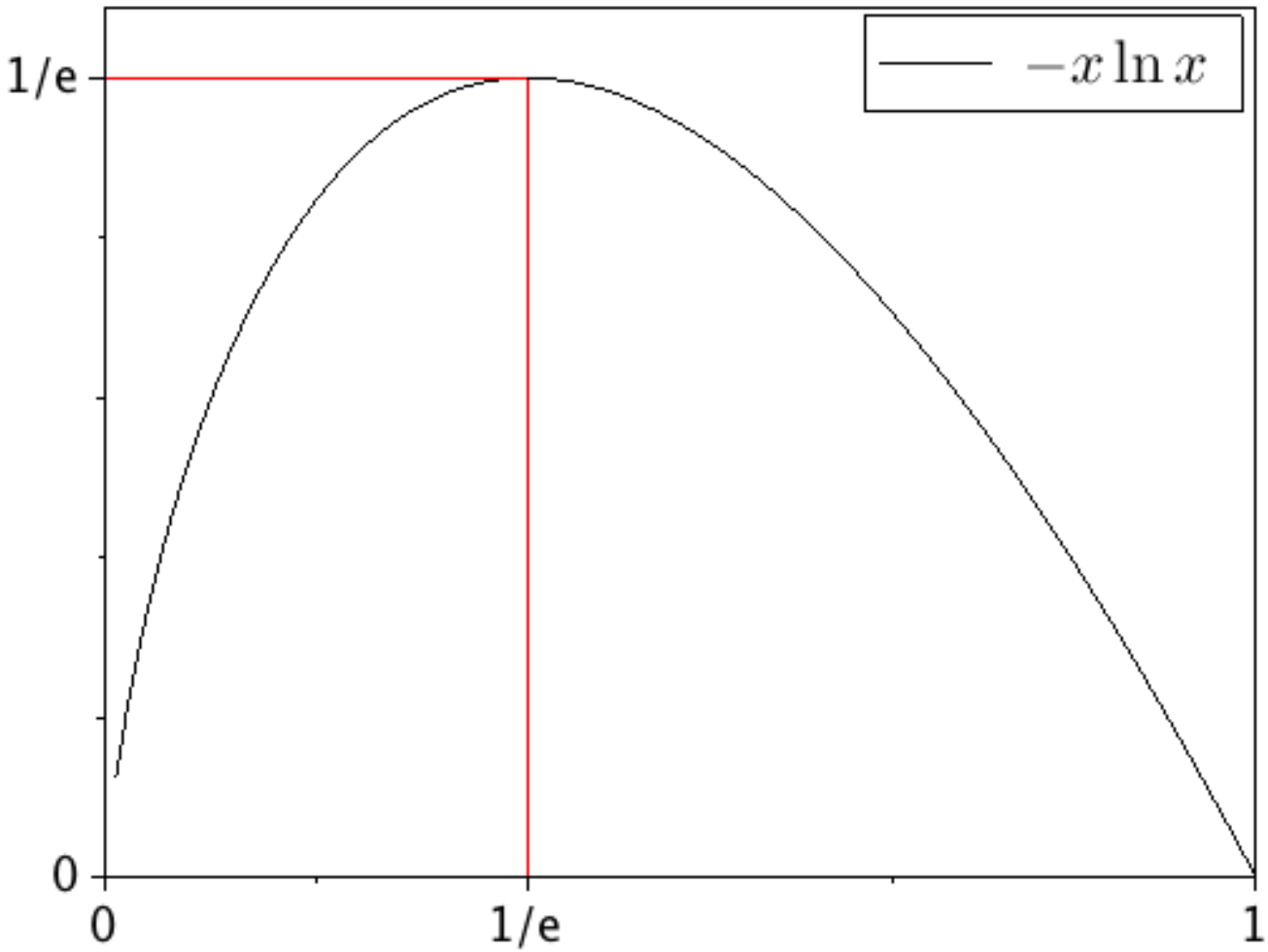
Since $1/t$ is decreasing, Left Sum > Integral > Right Sum. Use $x = p/n$ and $\Delta t = 1/n$.

$$x \int_x^1 \frac{dt}{t} = x \ln t \Big|_x^1 = x \ln 1 - x \ln x = -x \ln x$$

$$\frac{p}{n} \sum_{j=p+1}^{n} \frac{1}{(j-1)/n} \frac{1}{n} > -x \ln x > \frac{p}{n} \sum_{j=p+1} \frac{1}{j/n} \frac{1}{n}$$

$$\frac{p}{n} \sum_{j=p+1}^{n} \frac{1}{(j-1)} > -x \ln x > \frac{p}{n} \sum_{j=p+1} \frac{1}{j}$$

The $1/e \approx 37\%$ Rule



Finally

You have a lot of support, if you need help, ask.
You are the math department.