L32: Weds., April 19, 2017.

Housekeeping. · Essay draft due 11:59 p.m. tonight on Canvas

· Peer review on Friday - you must be present in class for this (half of your own grade depends on it!)

· Homework for Friday: You will be sent another student's essay to read; please use the rubric (that will be attached to the assignment descrip'n) to assign a grade and leave comments on the essay you're reading.

· Extra credit: TONIGHT, leaving 2 p.m. from parking lot behind Bowman Hall & returning around 9 p.m. — lecture in Worcester by Jordan Ellenberg, author of How Not to be Wrong! (Free to attend — please LET ME KNOW if you're coming.)

· Extra credit: Infographic (see Canvas)

· Extra credit (to be posted): other probability distrib. for discrete r.v.'s

· Exam 3: Fri, May 5 10:30 a.m., regular classroom (section 01)
Fri, May 5 1:00 p.m. (section 02) regular classroom

Last time: formula for binomial distribution

This time: · Playing a little w/ binomial distr.;
· Mean / E.V. & s.d. of binomial distr.

~~etc. r.v.'s~~

As we know, the binomial distribution's PDF table or histogram can be completely generated using a closed formula, depending on n (the no of trials) and on p (the probability of a "success"):

For $x \in \{0, 1, \ldots, n\}$,

$$\underbrace{P(X = x)}_{\text{"the probability of } x \text{ many successes in } n \text{ many trials"}} = {}_nC_x \cdot p^x \cdot (1-p)^{n-x},$$

where p is the probability of "success" on one trial.

Calculators & computers easily generate these PDFs ...

- instructions for TI calculators in OpenStax book
- see several web sites with applets.

Example: Blind guessing on multiple-choice exam; each question has 5 choices. For a random selection of 3 questions, the probability that you get x many right ...

$$X \sim \text{binom}\left(3, \tfrac{1}{5} = 0.2\right)$$

x	$P(X=x)$	$x \cdot P(X=x)$	$(x-\mu)^2 \cdot P(X=x)$
0	0.512	$0(0.512) = 0$	$(0.6)^2 \cdot 0.512 = 0.18432$
1	0.384	$1(0.384) = 0.384$	$(0.4)^2 \cdot 0.384 = 0.06144$
2	0.096	$2(0.096) = 0.192$	$(1.4)^2 \cdot 0.096 = 0.18816$
3	0.008	$3(0.008) = 0.024$	$(2.4)^2 \cdot 0.008 = 0.04608$
		$\mu = 0.6$	$\sigma^2 = 0.48$
			$\sigma \approx 0.07$

In groups: compute $E[X]$

$n = 3$
$p = 0.2$

Compute $\sigma[X]$

Observe: BINOMIAL R.V.'s ONLY!!

$$E(X) = n \cdot p = 3(0.2) = 0.6$$

$$\sigma^2 = n \cdot p \cdot (1-p) = 3(0.2)(0.8) = 0.48$$