3/30/2015 Stat 381

Normal pdf $f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{\sim}$

$|x-2| > 3$

$\Rightarrow$ $x-2>3$ or $-(x-2) > 3$

$x > 5$ or $x-2 < -3$

$x < -1$

7
3 Standardize $z = \frac{x-\bar{x}}{s}$
2 find $\bar{x}$
6 find s

	E(X) and V(X)		
Bern	p	pq	$q = 1-p$
Binomial	np	npq	
Geom	$\frac{1}{p}$	$\sim$	
Normal	μ	σ^2	
Poisson	λ or λt	same ie λ (or λt)	
Gamma	$\alpha\beta$	$\alpha\beta^2$	
Exp.	β	β^2	
Unif(a,b)	$\frac{b+a}{2}$	$\sim$	

The avg # of rainbows at my cabin each year ~~summer is~~ 5 per month, and follows a Poisson distribution.

- What is the probability of atleast 1 rainbow in a week?

5/month 5 per 30 days

What dist. does $Y = \#$ during 1 week

avg in 7 days is $\frac{7}{30} \cdot 5 = 1.167$

$Y \sim \text{Poisson}(1.167)$ $f(y) = \frac{1.167^y e^{-1.167}}{y!}$

$P(Y \geq 1) = 1 - P(Y=0)$

$= 1 - e^{-1.167} = .6887$

$= 1 - \text{poissonpdf}(1.167, 0)$

What is the average length of time between rainbows?

5/month ie 5/30 days

avg length of time is $\frac{30 \text{ days}}{5 \text{ rainbows}} = 6$ days

The length of time (in days) until α rainbows follows a Gamma$(\alpha, \beta = 6)$

Length of time between rainbows follows $\exp(\beta = 6)$

What is the probability it takes more than 10 days until you get a rainbow?

$X =$ time between rainbows

$X \sim \exp(6)$ (units is days)

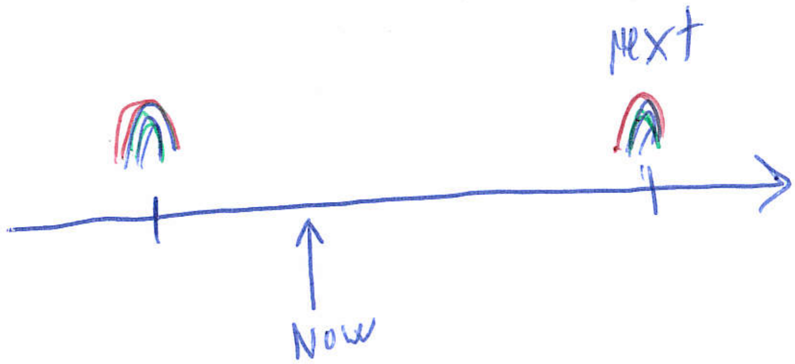
$f(x) = \frac{1}{6} e^{-x/6}$ for $x \geq 0$

$P(X > 10) = \int_{10}^{\infty} \frac{1}{6} e^{-x/6}\, dx$ let $u = \frac{x}{6}$

$= -e^{-x/6} \Big|_{10}^{\infty} = -e^{-\infty/6} - -e^{-10/6}$

$= 0 + e^{-10/6}$

$= .1889$



Ask a person if he or she is left handed.

Prob is 10%

assign 1 if yes 0 if no.

$X_1, \ldots, X_{100}$ ~~drawn~~ sampled iid

know $\sum_{i=1}^{100} X_i$ is Binomial $(100, .1)$

$\bar{X}$. takes value between 0 and 1

$$\bar{X} \sim \text{Normal}\left(p, \frac{pq}{n}\right)$$

$$\sim \text{Normal}\left(.1, \frac{.09}{100}\right)$$