Disc. Sec. 4

AMS131 10 Aug 17

1

$(Y \mid n, p) \sim \text{Binomial}(n, p)$

\# IID Bernoulli trials

"success" probability

$n = 1, 2, \ldots$

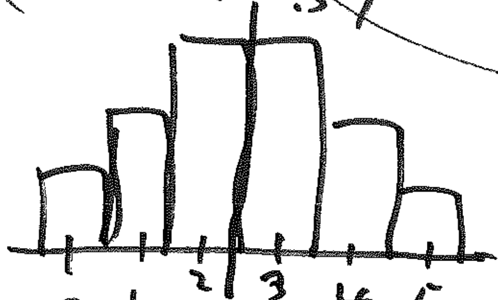
$(0 < p < 1)$

pmf of Y is

$$P(Y = y \mid n, p) = \begin{cases} \binom{n}{y} p^y (1-p)^{n-y} & \text{for } y = 0, 1, \ldots, n \\ 0 & \text{else} \end{cases}$$

$$= \binom{n}{y} p^y (1-p)^{n-y} \, I(y \text{ integer between } 0 \text{ \& } n \text{ inclusive})$$

$(n = 5, p = 0.5)$



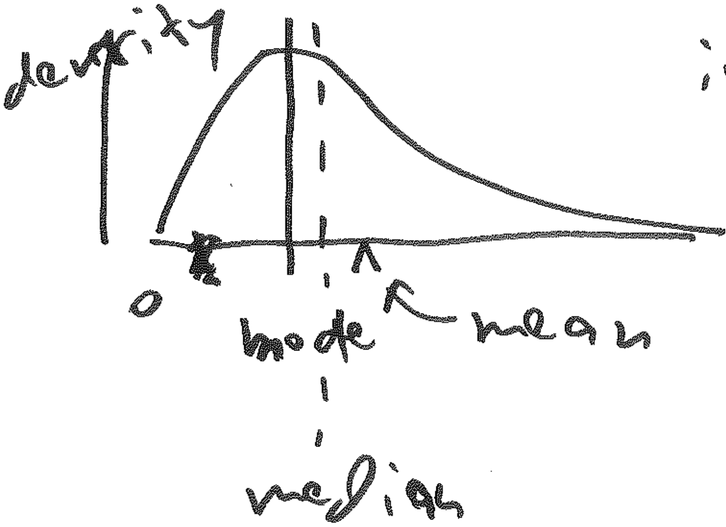
point of symmetry = mode

$E(Y)$ = expected value of Y

= expectation of Y

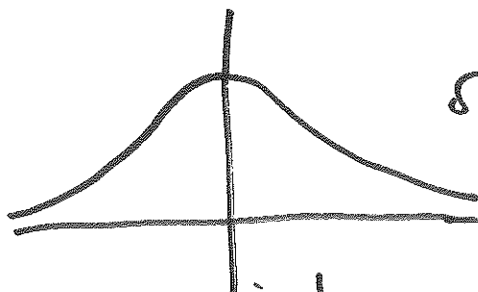
$\longleftrightarrow$ mean of an infinite # of draws from dist.

conjecture 1: $E(Y \mid n, p) = n \cdot p$ (✓) 2



income

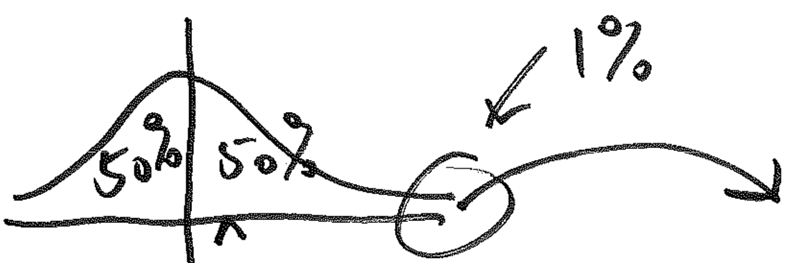
median = 50^{th} percentile



symmetric unimodal

point of symmetry
= mode
= median

geometric interpretation of mean (expected value): balance point



.75 .25

$q = 1 - p$

$\binom{n}{y} p^y (1-p)^{n-y}$ $\quad \binom{n}{y}(1-p)^y p^{n-y}$

$\binom{n}{y} = \binom{n}{n-y}$

$(Y \mid \lambda) \sim \text{poisson}(\lambda) \longleftrightarrow (\lambda > 0)$ 3

pmf is $\quad p(Y = y \mid \lambda) = \begin{cases} \dfrac{\lambda^y e^{-\lambda}}{y!} & y = 0, 1, \ldots \\ 0 & \text{else} \end{cases}$