4/24/19

Section 4

Binomial Distributions

$Y :=$ # of success in n success/failure independent and identically distributed tools, each one with probability p of success

$Y \sim \text{Binomial}(n, p)$ $\quad n =$ # of trials $= 0, 1, 2, 3 \ldots$

$p =$ the probability of success

$p \in [0, 1]$

Ex: $n = 5$ $p = \frac{1}{2}$ $Y \sim \text{Binomial}(5, \frac{1}{2})$

$P(Y=0) = 1/32$

$P(Y=1) = 5/32$

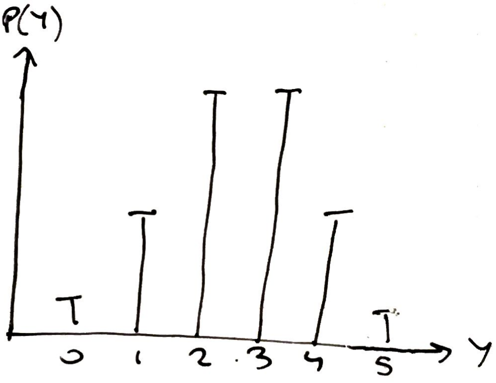
$P(Y=2) = 10/32$

$P(Y=3) = 10/32$

$P(Y=4) = 5/32$

$P(Y=5) = 1/32$

These add up to 1



$Y \sim \text{Binomial}(n, p)$ $\quad P(Y=i) = 0$ $\quad \forall i > n$ (For every i greater than n)

$P(Y=0) = (1-p)^n$ $\quad$ 0: x x x x … x

$P(Y=1) = (1-p)^{n-1} pn$ $\quad$ 1: ✓ x x x … x

$P(Y=i) = p^i(1-p)^{n-i}\binom{n}{i}$ :: $\underline{\checkmark}\,\underline{\checkmark}\,\underline{\checkmark}\,\underline{x}\ldots\underline{x}$

Positive skew: histogram is changed to the left side

Negative skew: histogram is changed to the right side

No skew: symmetrical histogram

negative none positive