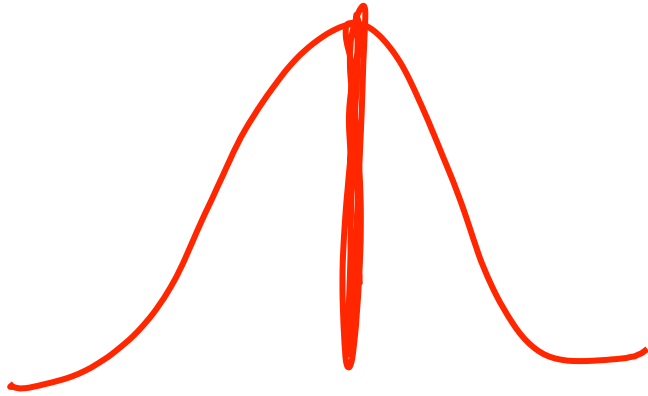


100%



Probability Distribution





Central Limit Theorem

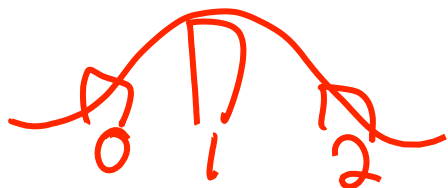


Flip a Coin 2 Times

TT 0 $\frac{1}{4}$

TH } 1 $\frac{1}{2}$
HT }

HH 2 $\frac{1}{4}$



Flip a Coin 4 Times

TTTT $1/16$
HTTT
THTT
TTHT
TTT# $4/16$
 $6/16$

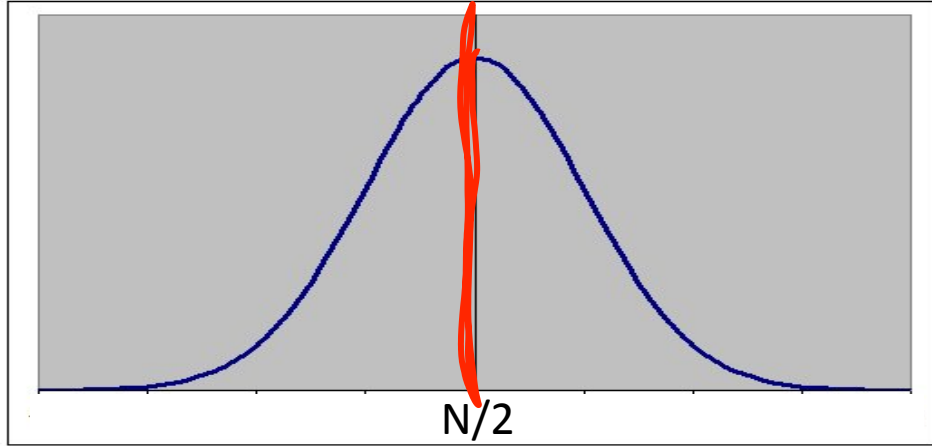


Flip a Coin N Times

$$N/2$$



Bell Curve



Binomial Distribution

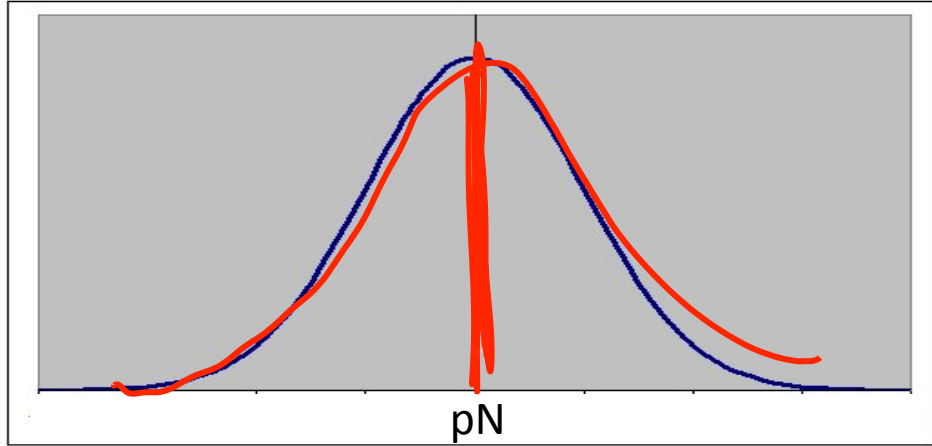
$$\text{Mean} = pN$$

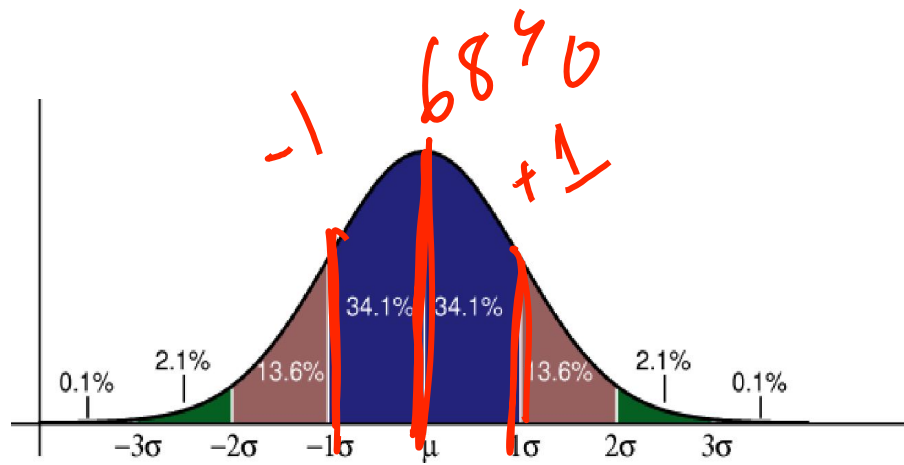
$$N = 1000$$

$$p = .15$$

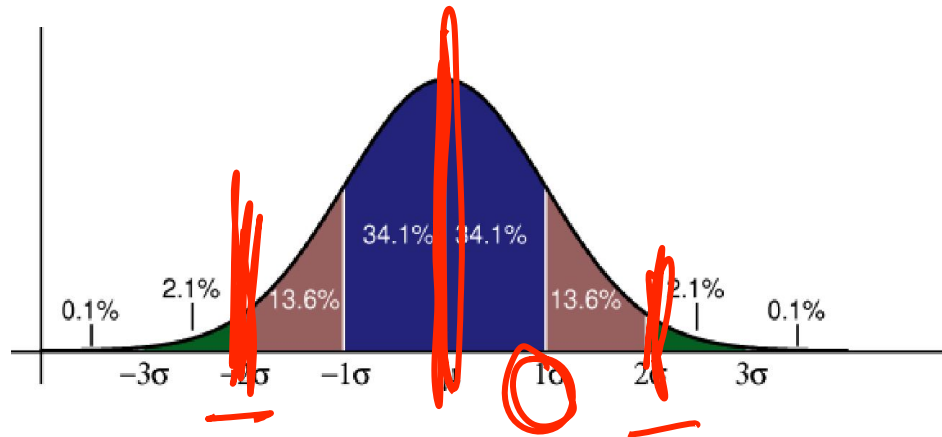
$$pN = 150$$

Bell Curve





σ = standard deviation



± 1 s.d. 68%

± 2 s.d. 95%

± 3 s.d. 99.75%

$\mu = 100$
 $s.d. = 2$

Binomial Distribution $P=1/2$

$$\text{Mean} = N/2$$

$$N=100$$

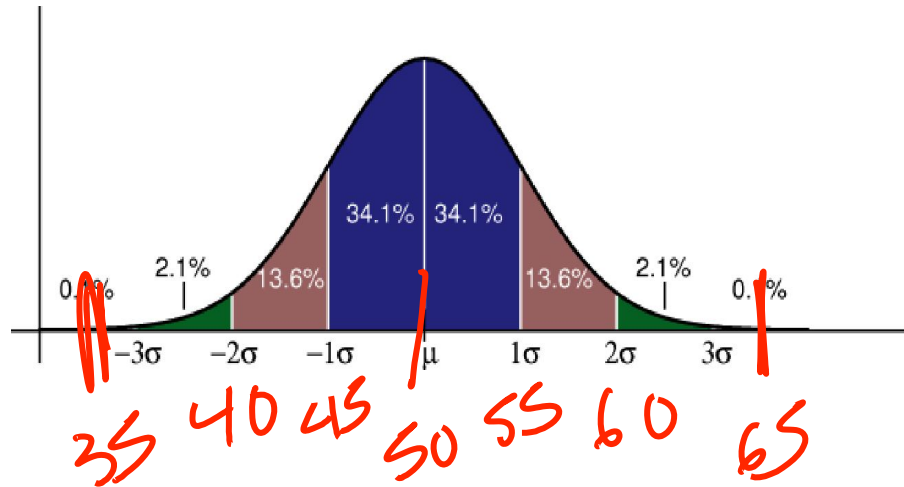
$$50$$

$$\text{S.D.} =$$

$$\frac{\sqrt{N}}{2}$$

$$\frac{10}{2} = 5$$





Binomial Distribution

$$\text{Mean} = pN$$

$$\text{S.D.} = \sqrt{p(1-p)N}$$

$$\sqrt{(1/2 \cdot 1/2) N}$$

$$1/2 \sqrt{N}$$



Boeing 747: 380 seats

90% show up rate

Sell 400 Tickets

$$400(.9) = 360$$

$$N = 400 \quad P = .9$$

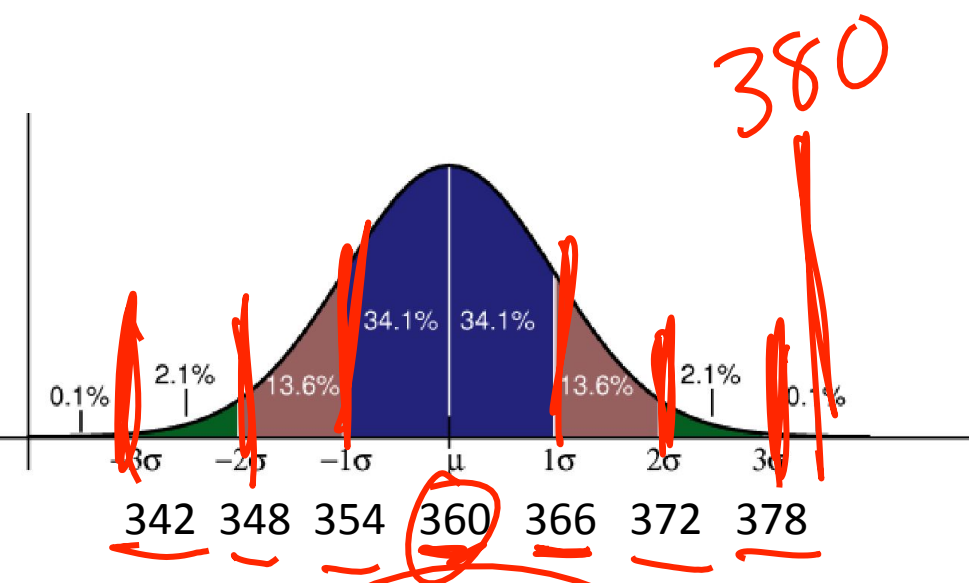
$$\text{Mean} = pN \quad 360$$

$$\text{S.D.} = \sqrt{p(1-p)N}$$

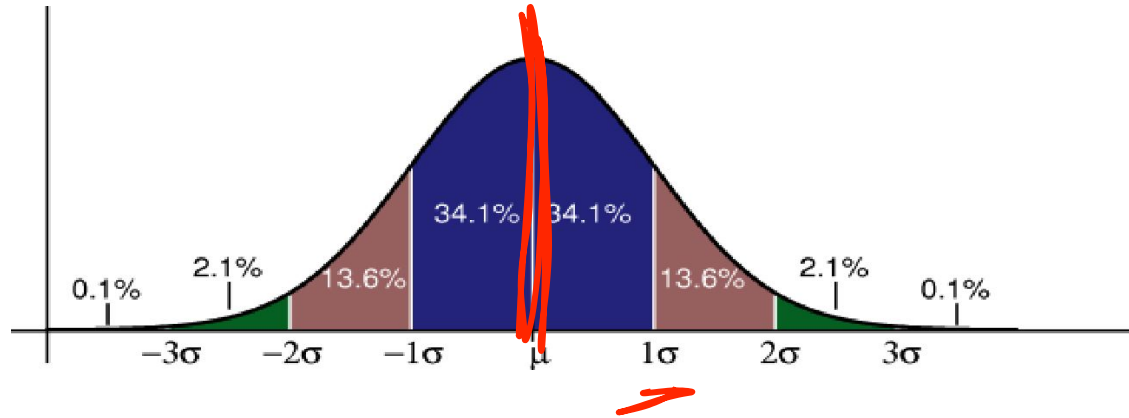
$$\sqrt{(.9)(.1) 400}$$

$$\sqrt{36} = 6$$





99.75+



Number people on plane ✓

Total weight of bags

Number of snack boxes buy

Total Age

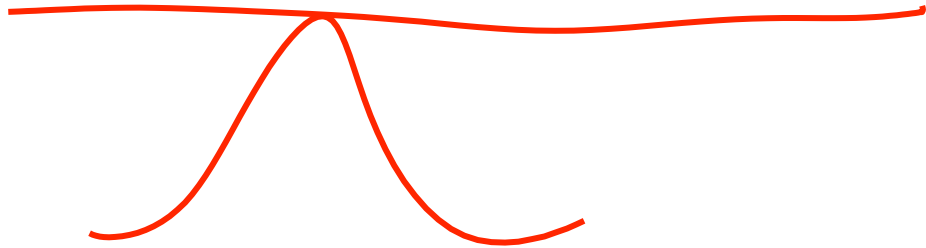


Central Limit Theorem:

Add random variables

- independent
- finite variance

Sum to a normal distribution





Bimodal Distribution

-

Model Thinking

Scott E Page

