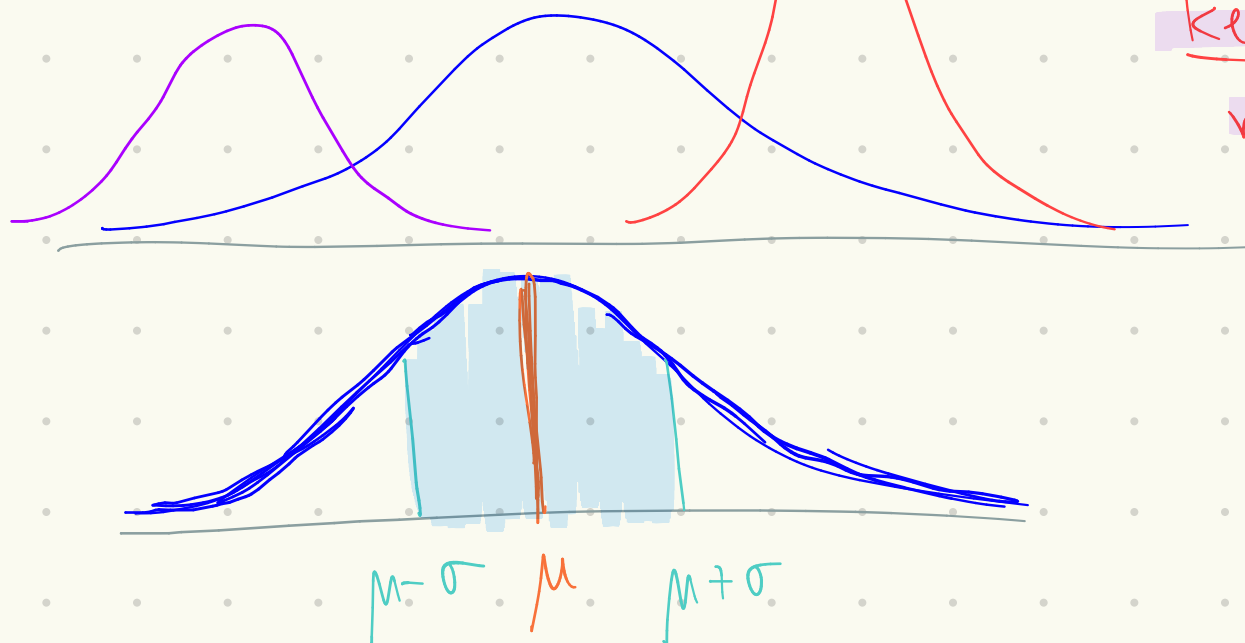# Chapter 7 Review

__def__ X a __continuous__ random variable (RV).
X is __normally distributed__ if the
distribution looks like a bell-curve

__key lots of normal curves__
depend on
mean μ &
standard deviation σ

$\mu - \sigma \quad \mu \quad \mu + \sigma$

Key Properties

① bell-shaped / symmetric

✳ ② | AREA = PROBABILITY |

③ Mean = median = mode

Notation

[CALC] 2nd + VARS ⟶ #2. normalcdf(✳

EE
↓
$-\infty = -1 E 99$
$+\infty = 1 E 99$

low high   0   1
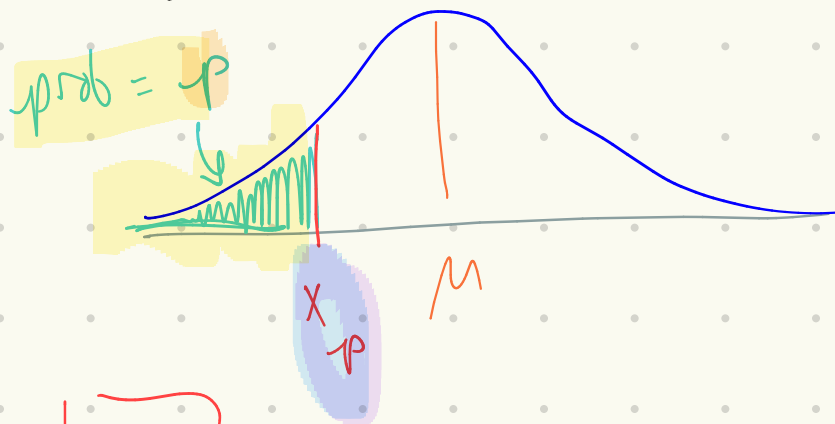
$$P(a < x < b) = \text{normalcdf}(a, b, \mu, \sigma)$$

= probability of selecting ONE person/item from X
having values between a and b.

= proportion of people/items from X
that have values between a and b.
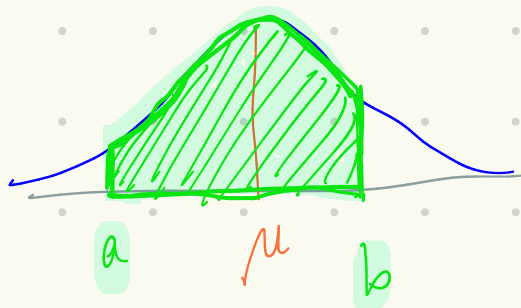
Inverse Normal

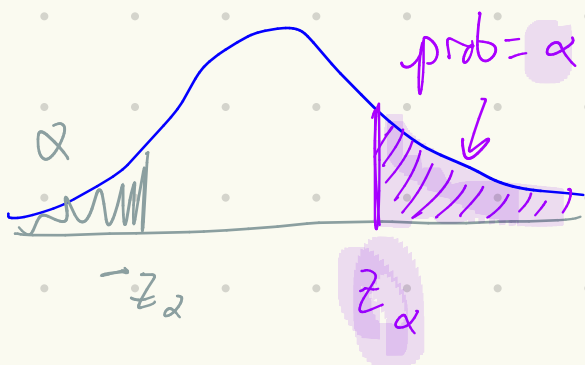Given a probability , we want to know the value of x w z .

prob = p

X_p

μ

Given p , $\boxed{x_p}$ = value on x-axis that seperates probability ⓟ on the left tail

$$x_p = \text{inv Norm}(p, \mu, \sigma, \text{TAIL})$$

Note older TI's dont have tail ⟶ use LEFT

ASSUMING STANDARD NORMAL ($\mu = 0, \sigma = 1$)

Critical Value z_α = z-score that seperates probability α on the RIGHT Tail

prob = α

α

$-z_\alpha$ z_α

$$z_\alpha = \text{inv Norm}(\alpha, 0, 1, \text{RIGHT})$$

= older

$$\text{inv Norm}(1-\alpha, 0, 1)$$

$$z\text{-dist} = \text{standard normal dist}$$

$$\mu = 0 \ \& \ \sigma = 1$$
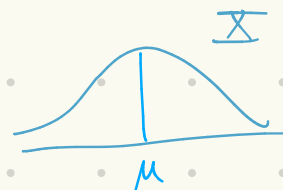
Ch 8 Review

Sampling Distributions :

the distribution of **ALL** samples of size n of a RV X

Sampling Dist of MEAN

$\bar{X}$

μ

Given a RV X w/
① mean μ & st.dev. σ
② SRS & indep sample size n

EX Height of all
GCC students
• Sampling dist?
↳ distribution of
all samples of 100
GCC students heights

Conclusions

① distribution of all sample means $\bar{x}$
    are (approx.) normally dist
    as   n increases
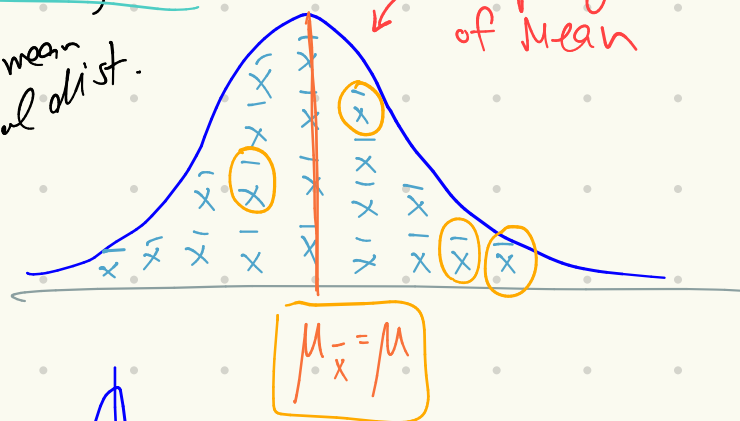
(CLT)

② $\mu_{\bar{x}} = \mu$ ← population mean for original dist.

$\sigma_{\bar{x}} = \dfrac{\sigma}{\sqrt{n}}$

Sampling Dist of Mean

$\mu_{\bar{x}} = \mu$

How to use

Step 0 Are you selecting n people/items w/ n > 1?
Step 1 Is X normally dist OR n > 30?
Step 2 Find $\mu_{\bar{x}}$ & $\sigma_{\bar{x}}$
Step 3 Use **normalcdf** w/ $\mu_{\bar{x}}$ & $\sigma_{\bar{x}}$.

Sampling Dist of Proportion

Given a RV X that has
- ① population proportion p.
- ② SRS & indep. sample size n

Conclusions ① shape of distribution of all samples $\hat{p}$ are (approx.) normally distributed as n increases

(CLT)

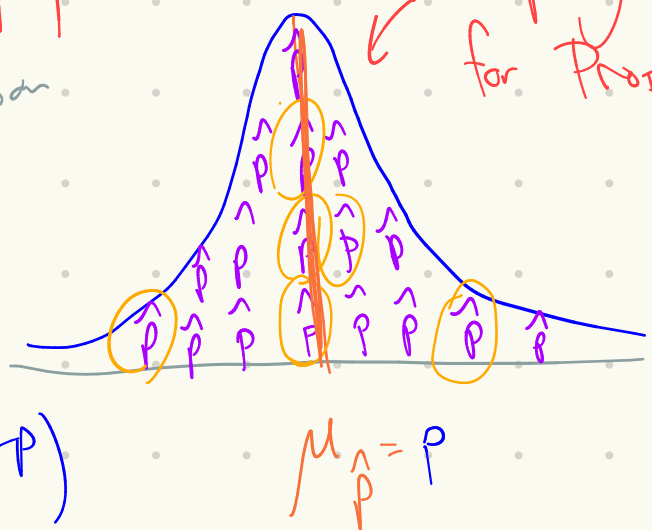provided that $n \cdot \hat{p} \cdot \hat{q} \geq 10$

②

$$\mu_{\hat{p}} = p$$

— pop. proportion

$$\sigma_{\hat{p}} = \sqrt{\frac{pq}{n}}$$

$(q = 1-p)$

Sampling Dist for Proportion

$\mu_{\hat{p}} = p$

How to use

- step 0 Are you selecting n people/items w/ $n > 1$?
- step 1 Is X normally dist $n > 30$ & $n \cdot \hat{p} \cdot \hat{q} \geq 10$
- step 2 Find $\mu_{\bar{x}}$ & $\sigma_{\bar{x}}$
- step 3 Use normalcdf w/ $\mu_{\hat{p}}$ & $\sigma_{\hat{p}}$.