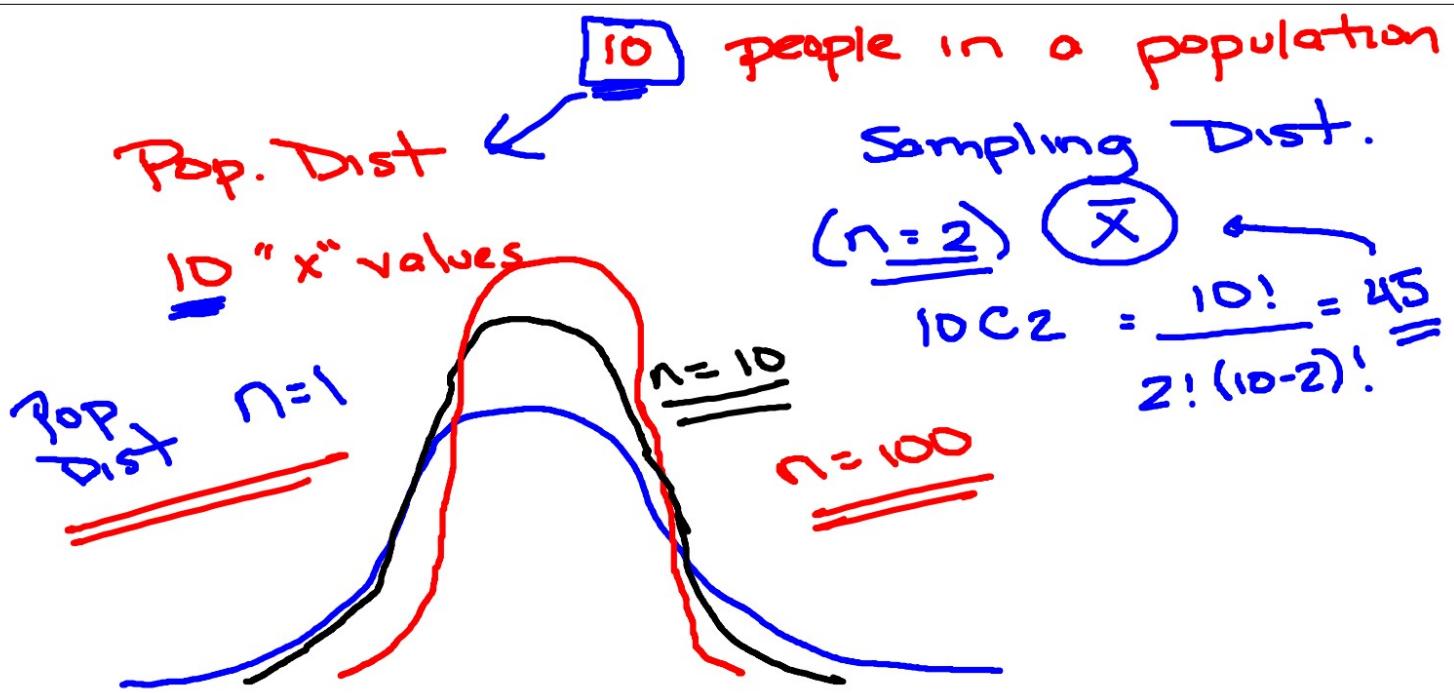


" n " = sample size



	<u>Population</u>		<u>Sample</u>	
(Mu)	μ		\bar{x}	(x-bar)
(Sigma)	σ	S.D	s	
P		* proportion (categorical)	\hat{p}	(p-hat)
(Unknown)				(we can calculate)

S.D of population σ

S.D of sampling distribution
for sample means

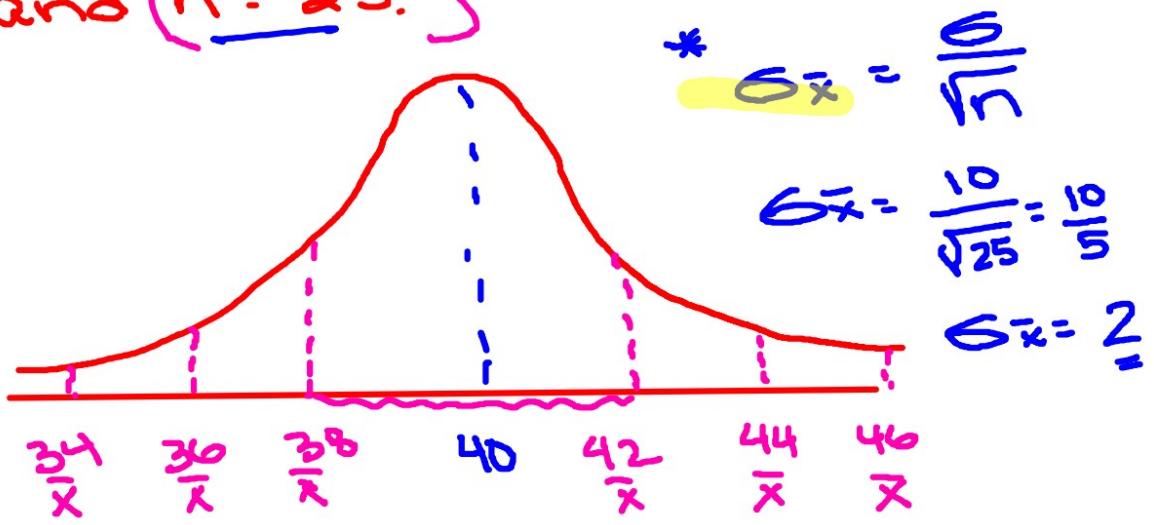
* $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ → Formula Sheet

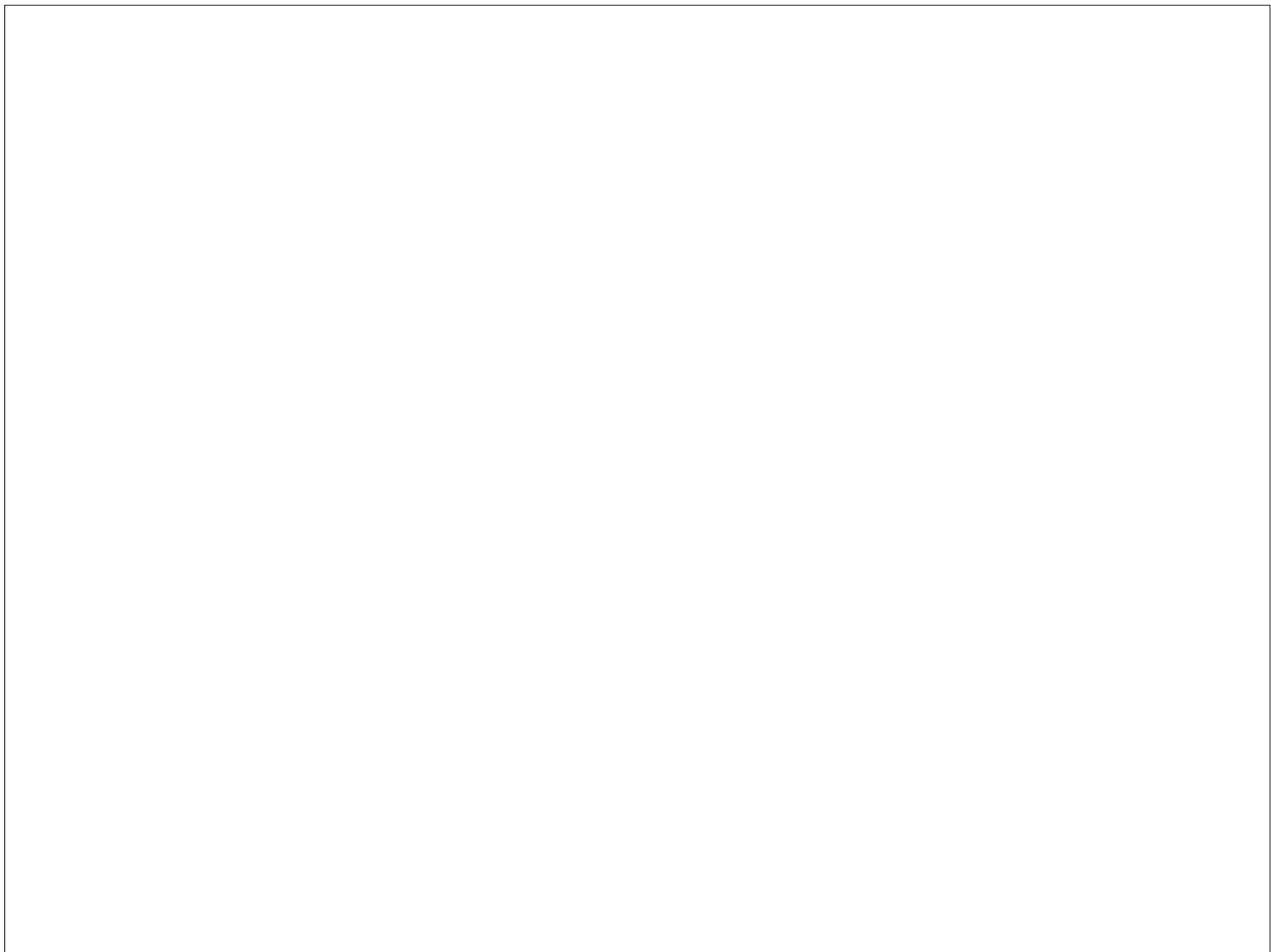
* SD for a sampling distribution
for sample proportions

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$$

→ Formula sheet

Sketch a normal distribution
 for the sampling dist. of sample
means given $\mu = 40$, $\sigma = 10$
 and $n = 25$.

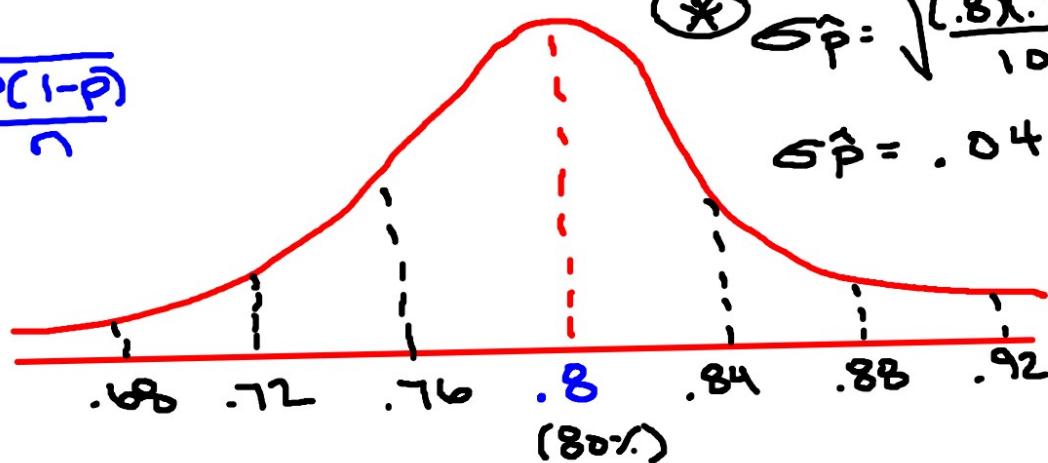




$P = .8$ *We know 80% of people in
 $n = 100$ MD like crabs. We take
 a sample of 100.
 sketch the sampling Dist.

$$\left\{ \begin{array}{l} \mu_{\hat{P}} = P \\ \sigma_{\hat{P}} = \sqrt{\frac{P(1-P)}{n}} \end{array} \right.$$

* $\sigma_{\hat{P}} = \sqrt{\frac{(0.8)(0.2)}{100}}$
 $\sigma_{\hat{P}} = .04$ (4-1.)



Proportions

* Normality: $np \geq 10$
 $n(1-p) \geq 10$

$$\hat{\mu_p} = p$$

$$\hat{S_p} = \sqrt{\frac{p(1-p)}{n}}$$

Means

* Normality: $n \geq 30$

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

$$S_{\bar{x}} = \frac{S}{\sqrt{n}}$$

* Conditions in order
to use formulas

(*) Universal Checks

1. Random Sample ✓ ✓
2. $10n <$ Population Size ✓
(INDEPENDENT)

Lie detectors are based on measuring changes in the nervous system. The assumption is that lying will be reflected in physiological changes that are not under the voluntary control of the individual. When a person is telling the truth, the galvanic skin response scores have a distribution that is normal with a mean of 48.6 and a standard deviation of 4.

$$\sqrt{\mu} = 48.6 \checkmark$$

$$\sqrt{\sigma} = 4 \quad n=40$$

Normality Check

$$n > 30 \checkmark$$



* We took a random sample of 40 people, what is the probability the mean of the sample is over 49?

v. Random Sample \checkmark

v. $10n < \text{Pop. Size}$ \checkmark

$$\mu_{\bar{x}} = \mu = 48.6$$

$$S_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{4}{\sqrt{40}}$$

$$Z = \frac{49 - 48.6}{0.632} \checkmark$$

$$Z \approx 0.632$$

$$Z = .63 \quad \frac{.7357}{1 - .7357}$$

$$.2643 \quad \text{ANS.}$$

* Anytime you are given a S.D. you are dealing with quantitative data

Ex: 70% of people in NY like pizza
 we take a random sample of 50
 people. What is the probability
 that over 74% of the sample
 likes pizza? **Categorical**

④ Normality ✓

$$np \geq 10 \quad 50(0.7) = 35 \checkmark$$

$$n(1-p) \geq 10 \quad 50(0.3) = 15 \checkmark$$

1. Random Sample ✓

2. $10(50) < \text{Pop. Size}$ ✓

$$\mu_{\hat{p}} = p = .7 \quad n = 50$$

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}} = .0648$$

$$= \sqrt{\frac{(0.7)(0.3)}{50}} \quad Z = \frac{.74 - .7}{.0648}$$

$$\boxed{.2676}$$

$$1 - (0.7324) = .62$$