	Proportions	Means
Mean	$\mu_{\hat{p}} = p$	$\mu_{\bar{x}} = \mu$
St. Dev. Check	$N \geq 10n$	$N \geq 10n$
St. Dev. Formula	$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$	$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$
Normal Approx.	$np \geq 10$ and $n(1-p) \geq 10$	if $n \geq 30$ we can ~~[illegible]~~ treat as approx. Normal b/c of Central Limit Theorem
Calculations	• picture w/ shading • Z-score • answer	• picture w/ shading • Z-score • answer
Conclusion	state conclusion in context of the problem	state conclusion in context of the problem

As part of a promotion for a new type of cracker, free samples are offered to shoppers in a local supermarket. The probability that a shopper will buy a package of crackers after tasting the free sample is 0.2. Different shoppers can be regarded as independent trials. Let $\hat{p}$ be the sample proportion of the next 100 shoppers that buy a package of crackers after tasting the free sample. What is the probability that fewer than 30% of these individuals buy a package of crackers after tasking a sample?

$p = 0.2$

$n = 100$

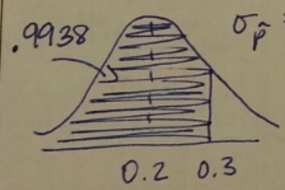
$N \geq 10(100) = 1000$

Assume at least 1000 shoppers

$np = 100(.2) = 20 \geq 10$

$n(1-p) = 100(.8) = 80 \geq 10$

Can use Normal approx.



$\sigma_{\hat{p}} = \sqrt{\frac{(.2)(.8)}{100}} = 0.04$

$z = \frac{0.3 - 0.2}{0.04} = 2.5$

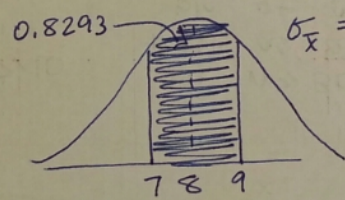
99.38 % chance that fewer than 30% of these indiv. buy a package of crackers.

The duration of Alzheimer's disease, from the onset of symptoms until death, ranges from 3 to 20 years, with a mean of 8 years and a standard deviation of 4 years. The administration of a large medical center randomly selects the medical records of 30 deceased Alzheimer's patients and records the duration of the disease for each one. Find the probability that the average duration of the disease for the 30 patients will be within 1 year of the overall mean of 8 years.

$N \geq 10(30) = 300$

Assume at least 300 Alzheimer's patients at this medical center

Because $n \geq 30$, we can treat samp. dist as approx Normal by CLT



$\sigma_{\bar{x}} = \frac{4}{\sqrt{30}} = 0.73$

$z = \frac{7-8}{.73} = -1.37$ $\quad z = \frac{9-8}{.73} = 1.37$

There is an 82.93 % change that the avg duration of the disease will fall btw 7 and 9 yrs.