CRAFTON HILLS COLLEGE TUTORING CENTER

Chapter 5 Normal Probability Distributions

	Continuous Prob. Dist. 5.1 & 5.2	Finding Values 5.3	Sample Mean, $\bar{x}$ 5.4	Proportion, $\hat{p}$
Guidelines	1. Stated that distribution is normal or approximately normal. 2. The normal curve is bell-shaped and is symmetric about the mean. 3. The mean, median, and mode are equal. **Std. Norm. Dist.**: $\mu = 0$; $\sigma = 1$; **Total Area Under Cure** = 1		1. Stated that the calculation is determining the distribution of the sample mean. 2. sample size must be large enough ($n \geq 30$)	1. The sample size is less than or equal to 5% of the population size: ($n \leq 0.05N$) 2. Normally distributed
Formulas	$z = \frac{(x-\mu)}{\sigma}$ =STANDARDIZE(x,*mean*,*standard_dev*)	**Transforming a z-score to an x value:** $x = \mu + z\sigma$	$z = \frac{(\bar{x}-\mu_{\bar{x}})}{\sigma_{\bar{x}}}$	$z = \frac{(\hat{p}-\mu_{\hat{p}})}{\sigma_{\hat{p}}}$
Excel	***Area to the Left (Less than):*** =NORM.DIST(x,μ,σ,TRUE) ***Area to the Right (More than):*** =**1**-NORM.DIST(x,μ, σ,TRUE)	***Area to the Left* (Below):** =NORM.INV(p,μ,σ) ***Area to the Right (Above):*** =NORM.INV((**1**-p),μ,σ)	***Area to the Left:*** =NORM.DIST($\bar{x}$,μ,$\sigma_{\bar{x}}$,TRUE) ***Area to the Right:*** =**1**-NORM.DIST($\bar{x}$,μ,$\sigma_{\bar{x}}$,TRUE)	
	Finding the Probability Given a z-Score/ Find the Shaded Area Under the Curve: =NORM.S.DIST(z-score,TRUE)	**Finding Z-score given the Probability/ Percentile:** =NORM.S.INV(probability)		
Mean	**If not given: $\mu = 0$**	$\boldsymbol{\mu} = n \cdot p$	$\boldsymbol{\mu_{\bar{x}}} = \mu$	$\boldsymbol{\mu_{\hat{p}}} = p$
Variance		$\boldsymbol{\sigma^2} = n \cdot p \cdot q$	$\boldsymbol{\sigma^2_{\bar{x}}} = \frac{\sigma^2}{n}$	$\boldsymbol{\sigma^2_{\hat{p}}} = \frac{p(1-p)}{n}$
Standard Deviation	**If not given: $\sigma = 1$**	$\boldsymbol{\sigma} = \sqrt{n \cdot p \cdot q}$	$\boldsymbol{\sigma_{\bar{x}}} = \frac{\sigma}{\sqrt{n}}$	$\boldsymbol{\sigma_{\hat{p}}} = \sqrt{\frac{p(1-p)}{n}}$