

STAT 215: REFERENCE SHEET FOR ANALYTIC INFERENCE

$$CI : \text{Statistic} \pm \text{Critical Value} \times \widehat{SE}$$

$$\text{Standardized Test Statistic} : \frac{\text{Statistic} - \text{Null Param.}}{\widehat{SE}}$$

Param.	Stat.	Randomization	Theory SE	Test Dist.
p	\hat{p}	Simulate from p_0	$\sqrt{\frac{p_0(1-p_0)}{n}}$	Normal
μ	\bar{x}	Bootstrap + shift	$\frac{s}{\sqrt{n}}$	t_{n-1}
$p_A - p_B$	$\hat{p}_A - \hat{p}_B$	Scramble groups	$\sqrt{\frac{\hat{p}(1-\hat{p})}{n_A} + \frac{\hat{p}(1-\hat{p})}{n_B}}$	Normal
$\mu_A - \mu_B$	$\bar{x}_A - \bar{x}_B$	Scramble groups	$\sqrt{\frac{s_A^2}{n_A} + \frac{s_B^2}{n_B}}$	$t_{\min(n_A-1, n_B-1)}$
μ_D	\bar{x}_D	Flip pairs*	$\frac{s_D}{\sqrt{n_D}}$	t_{n_D-1}
ρ	r	Scramble pairings	$\sqrt{\frac{1-r^2}{n-2}}$	t_{n-2}

The main R functions to get tail proportions and quantiles from theoretical distribution models such as Normal and t : (elements in caps, other than TRUE and FALSE, should be replaced by values).

```
## returns area to the left of CUTOFF in a N(MEAN,SD) distribution
xpnorm(CUTOFF, mean = MEAN, sd = SD, lower.tail = TRUE)
## returns area to the right of CUTOFF
xpnorm(CUTOFF, mean = MEAN, sd = SD, lower.tail = FALSE)
## returns the Pth quantile of a N(MEAN, SD) distribution
## (i.e., the value with proportion P below it)
xqnorm(PROPORTION, mean = MEAN, sd = SD, lower.tail = TRUE)
## returns the (1 - P)th quantile of a N(MEAN, SD) distribution
## (i.e., the value with proportion P above it)
xqnorm(PROPORTION, mean = MEAN, sd = SD, lower.tail = FALSE)
```

For a t -distribution, replace norm with **t** (e.g, **xpt()** and **xqt()**), and instead of **mean=** and **sd=**, supply degrees of freedom with **df=**.