

Answer each question below on separate sheets of paper. Make sure to clearly label each of your answers (e.g., #1), put your name on each extra sheet used, and staple these questions to the top of your answer sheets when completed to hand in. Also make sure to read the directions carefully.

```
library(NCStats)
distrib(val,mean=meanval,sd=sdval,lower.tail=FALSE,type="q")
distrib(val,distrib="X",df=dfval,lower.tail=FALSE,type="q")
```

where

- **val** is a value of the quant. variable or area (i.e., percentage as a proportion)
 - **meanval** is population mean (μ) for a normal distribution
 - **sdval** is standard deviation (σ) or error (SE) for a normal distribution
 - **distrib="X"** has "X" replaced with "t" for a t- and "chisq" for a χ^2 -distribution
 - **dfval** is the degrees-of-freedom for t- and χ^2 -distributions
 - **lower.tail=FALSE** is included for "right-of" calculations
 - **type="q"** is included for reverse calculations
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11 Steps for any Significance Test

1. [2] state the rejection criterion (α),
2. [4] state the null and alternative hypotheses to be tested – define the parameter,
3. [2] determine which hypothesis test to use – thoroughly explain why,
4. [2] collect the data (address type of study and randomization),
5. [4] check all necessary assumptions – explain how you tested the validity,
6. [2] calculate the appropriate statistic(s),
7. [4] calculate the appropriate test statistic,
8. [4] calculate the p-value,
9. [2] state rejection decision,
10. [4]* summarize your findings in terms of the problem, and
11. [4]* If reject H_0 , compute a **100(1- α)% confidence region** for the parameter.

$$t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$$

$$\chi^2 = \sum \frac{(\text{Observed} - \text{Expected})^2}{\text{Expected}}$$

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - 0}{\sqrt{s_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}} \quad \text{where} \quad s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$