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> #This is my attempt to do the worksheets that I
> # left for students to use.
> #
> # Two Populations: sigma known
>
> # Case 1 through 5 have us doing confidence intervalus on
> # the difference of two means.  Let me start by loading
> # the function into the environment
>
> source("../ci_2known.R")
>
> # Case 1;
> #  I will store the required values in variables just so that
> # it is clear which values go where in the function
> sigma_1 <- 7.06
> n_1 <-38
> xbar_1 <- 76.95
> sigma_2 <- 8.82
> n_2 <- 51
> xbar_2 <- 71.24
> ci_2known( sigma_1, n_1, xbar_1,
+            sigma_2, n_2, xbar_2, 0.92 )
    CI Low   CI High Pnt. Est. St. Error    M of E   alpha/2   z-score
 2.761242  8.658758  5.710000  1.684344  2.948758  0.040000  1.750686
> #
> #
> # Case 2
> sigma_1 <- 5.47
> n_1 <-44
> xbar_1 <- 80.66
> sigma_2 <- 8.67
> n_2 <- 45
> xbar_2 <- 86.18
> ci_2known( sigma_1, n_1, xbar_1,
+            sigma_2, n_2, xbar_2, 0.99)
    CI Low   CI High Pnt. Est. St. Error    M of E   alpha/2   z-score
-9.469042 -1.570958 -5.520000  1.533115  3.949042  0.005000  2.575829
> #
> #
> # Case 3
> sigma_1 <- 8.86
> n_1 <-72
> xbar_1 <- 77.35
> sigma_2 <- 11.18
> n_2 <- 47
> xbar_2 <- 82.57
> ci_2known( sigma_1, n_1, xbar_1,
+            sigma_2, n_2, xbar_2, 0.995 )
      CI Low     CI High   Pnt. Est.   St. Error      M of E     alpha/2
-10.6555692   0.2155692  -5.2200000   1.9364103   5.4355692   0.0025000
     z-score
   2.8070338
> #
> #
> # Case 4
> sigma_1 <- 5.1
> sigma_2 <- 6.5
> # now we need to load gnrnd4 so that we can use it to generate the
> #    values in the table
> source("../gnrnd4.R")
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> # then we can generate the desired values of the first table
> gnrnd4(1895785504,5100746)
style= 4   size= 56    seed= 89578   num digits= 1   alt_sign= 1
[1] "DONE "
> # and now, we will look at the first and last six values
> # just to be sure we have the right values
> head(L1)
[1] 79.5 70.1 72.3 68.0 78.3 75.4
> tail(L1)
[1] 73.8 70.2 87.9 84.1 73.3 77.8
> #
> n_1 <- length( L1 )
> xbar_1 <- mean( L1 )
> #
> #  then generate the second table of values, remember that this
> #        will overwrite L1
> gnrnd4(1943827604,6500689)
style= 4   size= 77    seed= 94382   num digits= 1   alt_sign= 1
[1] "DONE "
> # and now, we will look at the first and last six values
> # just to be sure we have the right values
> head(L1)
[1] 60.6 65.8 72.6 59.4 75.3 68.9
> tail(L1)
[1] 76.8 62.2 76.8 72.3 67.7 68.1
> #
> n_2 <- length( L1 )
> xbar_2 <- mean( L1 )
> #
> # first sample size and mean
> n_1
[1] 56
> xbar_1
[1] 75.06429
> #second sample size and mean
> n_2
[1] 77
> xbar_2
[1] 68.42857
> #
> ci_2known( sigma_1, n_1, xbar_1,
+            sigma_2, n_2, xbar_2, 0.895 )
    CI Low   CI High Pnt. Est. St. Error    M of E   alpha/2   z-score
 5.003996  8.267433  6.635714  1.006561  1.631719  0.052500  1.621082
>
> #
> #
> # Case 5
> sigma_1 <- 6.4
> sigma_2 <- 9.3
> #
> # then we can generate the desired values of the first table
> gnrnd4(6128867204,6400432)
style= 4   size= 73    seed= 12886   num digits= 1   alt_sign= -1
[1] "DONE "
> # and now, we will look at the first and last six values
> # just to be sure we have the right values
> head(L1)
[1] -57.0 -42.0 -42.9 -46.8 -48.3 -30.7
> tail(L1)
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```
[1] -37.5 -40.2 -55.4 -32.1 -43.6 -48.8
> #
> n_1 <- length( L1 )
> xbar_1 <- mean( L1 )
> #
> #  then generate the second table of values, remember that this
> #        will overwrite L1
> gnrnd4(6179647104,9300514)
style= 4   size= 72    seed= 17964   num digits= 1   alt_sign= -1
[1] "DONE "
> # and now, we will look at the first and last six values
> # just to be sure we have the right values
> head(L1)
[1] -39.3 -42.4 -56.9 -51.3 -51.5 -45.5
> tail(L1)
[1] -50.3 -61.9 -69.8 -53.8 -40.1 -61.1
> #
> n_2 <- length( L1 )
> xbar_2 <- mean( L1 )
> #
> # first sample size and mean
> n_1
[1] 73
> xbar_1
[1] -44.28493
> #second sample size and mean
> n_2
[1] 72
> xbar_2
[1] -52.05556
> #
> ci_2known( sigma_1, n_1, xbar_1,
+            sigma_2, n_2, xbar_2, 0.815 )
    CI Low   CI High Pnt. Est. St. Error    M of E   alpha/2   z-score
 6.010957  9.530292  7.770624  1.327534  1.759668  0.092500  1.325516
>
> #  Starting with Case 6 we are looking at a test of a
> #  hypothesis the the two means are equal.  We will need to
> #  put our function into the environment
> #
> # Case 6
> #
> source("../hypo_2known.R")
> sigma_1 <- 5.70
> sigma_2 <- 8.34
> # set h_type  -1 for <, 0 for !=, 1 for > on alternative
> h_type <- -1
> alpha <- 0.03
> n_1 <- 58
> xbar_1 <- 79.16
> n_2 <- 65
> xbar_2 <- 81.73
> #
> # then run the function
> #
> hypoth_2test_known(sigma_1, n_1, xbar_1,
+                    sigma_2, n_2, xbar_2,
+                    h_type, alpha )
                  H1:            sigma_one                n_one
       "mu_1 < mu_2"                "5.7"                 "58"
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```
            mean_one           sigma_two               n_two
             "79.16"              "8.34"                "65"
            mean_two           std. err.          difference
             "81.73"  "1.27681579236758"  "-2.57000000000001"
           sig level                   z        critical low
              "0.03"  "1.88079360815125"  "-2.40142698107152"
       critical high            attained            decision
              "n.a." "0.0220667995131511"            "Reject"
> 
> #
> # Case 7
> #
> sigma_1 <- 12.04
> sigma_2 <- 15.15
> # set h_type  -1 for <, 0 for !=, 1 for > on alternative
> h_type <- 1
> alpha <- 0.02
> n_1 <- 43
> xbar_1 <- 87.86
> n_2 <- 42
> xbar_2 <- 81.27
> #
> # then run the function
> #
> hypoth_2test_known(sigma_1, n_1, xbar_1,
+                    sigma_2, n_2, xbar_2,
+                    h_type, alpha )
                  H1:           sigma_one               n_one
       "mu_1 > mu_2"             "12.04"                "43"
            mean_one           sigma_two               n_two
             "87.86"             "15.15"                "42"
            mean_two           std. err.          difference
             "81.27"  "2.97254460497592"              "6.59"
           sig level                   z        critical low
              "0.02"  "2.05374891063182"              "n.a."
       critical high            attained            decision
  "6.10486024427379" "0.0133130560707313"            "Reject"
> #
> # Case 8
> #
> sigma_1 <- 8.80
> sigma_2 <- 10.60
> # set h_type  -1 for <, 0 for !=, 1 for > on alternative
> h_type <- -1
> alpha <- 0.035
> # generate first sample
> gnrnd4(1177104204,8801266)
style= 4   size= 43    seed= 17710   num digits= 1   alt_sign= 1
[1] "DONE "
> #look at its head and tail  for confirmation
> head(L1)
[1] 139.4 120.0 123.0 123.4 115.9 121.6
> tail(L1)
[1] 134.7 133.3 129.5 130.2 138.0 128.0
> #
> n_1 <- length(L1)
> xbar_1 <- mean( L1 )
> #sample 1 length and mean
> n_1
[1] 43
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```
> xbar_1
[1] 127.6442
> # generate second sample
> gnrnd4(1903894404,10601312)
style= 4   size= 45    seed= 90389   num digits= 1   alt_sign= 1
[1] "DONE "
> #look at its head and tail  for confirmation
> head(L1)
[1] 135.6 132.6 118.9 155.9 109.9 133.0
> tail(L1)
[1] 125.5 131.0 139.0 130.3 127.3 119.9
> #
> n_2 <- length(L1)
> xbar_2 <- mean( L1 )
> #sample 2 length and mean
> n_2
[1] 45
> xbar_2
[1] 131.44
> #
> # then run the function
> #
> hypoth_2test_known(sigma_1, n_1, xbar_1,
+                    sigma_2, n_2, xbar_2,
+                    h_type, alpha )
                  H1:            sigma_one               n_one
       "mu_1 < mu_2"                "8.8"                "43"
            mean_one            sigma_two               n_two
  "127.644186046512"                "10.6"               "45"
            mean_two            std. err.          difference
            "131.44"   "2.07311821212564"  "-3.79581395348838"
           sig level                    z        critical low
             "0.035"    "1.8119106729526"  "-3.75630501484286"
       critical high             attained            decision
              "n.a." "0.0335526292660019"            "Reject"
>
```