Hypothesis Testing Basic Exercises Part 1

1. First Name

2. Last Name

3. Specify the null and alternative hypotheses for the following tests. Use = for equal, <> for not equal, <= for less than and equal, >= for greater than and equal, < for less than, > for greater than.

   a. Test if the mean weight of cereal in a cereal box differs from 18 ounces.
   H0: mu = 18
   HA: mu <> 18

   b. Test if the stock price increases on more than 60% of the trading days.
   H0: p <= 0.6
   HA: p > 0.6

   c. Test if Americans get an average of less than seven hours of sleep.
   H0: mu >= 7
   HA: mu < 7

4. Find the critical values for the following hypothesis tests. Specify whether the value is a z or t by entering the answer as "z=" or "t=."

   a. H0: $\mu \leq 4.5$; HA: $\mu > 4.5$; $\alpha = 0.05$; $n = 24$ =ABS(T.INV(0.05, 23))
   t* = 1.71

   b. H0: $\mu = 4.5$; HA: $\mu \neq 4.5$; $\alpha = 0.05$; $n = 24$ = T.INV.2T(0.05, 23)
   t* = 2.07

   c. H0: $p \geq 0.2$; HA: $p < 0.2$; $\alpha = 0.05$ = NORM.S.INV(0.05)
   Z* = -1.645

5. Calculate the test statistic for the following tests. Find the critical values for the following hypothesis tests. Specify whether the value is a z or t by entering the answer as "z=" or "t=."

   a. H0: $\mu \leq 4.5$; HA: $\mu > 4.5$; x-bar = 4.8; s = 0.8; n = 24 $t_{23} = \frac{4.8 - 4.5}{0.8/\sqrt{24}} = 1.84$
   t = 1.84

   b. H0: p = 0.2; HA: $p \neq 0.2$; p-bar = 0.23; n = 30 $Z = \frac{0.23 - 0.2}{\sqrt{\frac{(0.2)(0.8)}{30}}} = 0.411$
   Z = 0.411

6. Consider the following hypotheses: H0: $\mu \leq 210$; HA: $\mu > 210$ Approximate the p-value for this test based on the following sample information.

   a. x-bar = 216, s = 26, n = 40 $t_{39} = \frac{216-210}{26/\sqrt{40}} = 1.46$

   Enter a numeric response. 0.0761 $= T.DIST.RT(1.46, 39)$

   b. x-bar = 216, s = 26, n = 80 $t_{79} = \frac{216-210}{26/\sqrt{79}} = 2.06$

   Enter a numeric response. 0.0213 $= T.DIST.RT(2.06, 79)$

   c. x-bar = 216, s = 16, n = 40 $t_{39} = \frac{216-210}{16/\sqrt{40}} = 2.37$

   Enter a numeric response. 0.0114 $= T.DIST.RT(2.37, 39)$

7. Consider the following hypotheses: H0: $p \leq 0.5$; HA: $p > 0.5$ Approximate the p-value for this test based on the following sample information.

   a. p-bar = 0.55; n = 50 $z = \frac{0.55-0.5}{\sqrt{\frac{(0.5)(0.5)}{50}}} = 0.71$

   Enter a numeric response. 0.2389 $= 1-NORM.S.DIST(0.71, 1)$

   b. p-bar = 0.55; n = 200 $z = \frac{0.55-0.5}{\sqrt{\frac{(0.5)(0.5)}{200}}} = 1.41$

   Enter a numeric response. 0.0793 $= 1-NORM.S.DIST(1.41, 1)$