(1) $H_0: p = 0.22$

claim → $H_1: p > 0.22$

$\alpha = 0.05$ (our choice)

✓ Claim
✓ Data
✓ α
✓ TS
✓ CV, PV
✓ CON

SAMPLE DATA

$n = 264$

$x = 65$

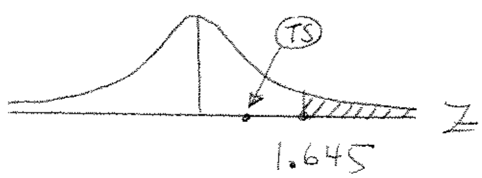
$\hat{p} = \frac{65}{264} \approx 0.246$

TEST STATISTIC

$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} \qquad z = \frac{.246 - .22}{\sqrt{\frac{(.22)(.78)}{264}}} \approx \boxed{1.028}$$

CRITICAL VALUE

P-Value $\approx \boxed{0.152}$



P-Value $> \alpha$, TS NOT IN CRITICAL REGION

$\boxed{\text{FAIL TO REJECT } H_0}$

There is NOT sufficient evidence to support the claim that entering Berkeley students classify themselves as liberals greater than the recently published 22% from the H.E.R. Institute study.

(2) (a) 95% CI for the proportion of brown baggers for lunch.

Sample Data

$n = 935$

$x = 315$

$\hat{p} = \frac{315}{935} \approx 0.337$

95% C.I.

$\alpha = 0.05$

$\alpha/2 = 0.025$

$\hat{p} - E < p < \hat{p} + E$

$.337 - E < p < .337 + E$

$E = Z_{\frac{\alpha}{2}} \sqrt{\frac{\hat{p}\hat{q}}{n}}$

$E = (1.96)\sqrt{\frac{(.337)(.663)}{935}}$

$E \approx 0.0303$

$\boxed{0.307 < p < 0.367}$

we are 95% confident that the true population proportion of U.S. workers who bring lunch in a brown bag is between 30.7% and 36.7%.

(b) we want n the sample size for a 95% CI

$n = (Z_{\frac{\alpha}{2}})^2 \cdot \frac{\hat{p}\hat{q}}{E^2}$

$\alpha = 0.05$ $\frac{\alpha}{2} = 0.025$

$n = (1.96)^2 \frac{(.337)(.663)}{(.02)^2} \approx 2,145.83$

ROUND UP 2,146

NPROP also $\boxed{2,146}$

(3) ENTER DATA INTO L1. Construct 95% C.I. for mean with σ UNKNOWN.

SAMPLE DATA

$n = 20$

$\bar{x} = 14.073$

$s \approx 3.872$

95% C.I.

$\alpha = 0.05$

$\alpha/2 = 0.025$

$\bar{x} - E < \mu < \bar{x} + E$

$14.073 - E < \mu < 14.073 + E$

$E = t_{\frac{\alpha}{2}} \cdot \frac{s}{\sqrt{n}}$

$E = (2.093) \cdot \frac{3.872}{\sqrt{20}}$

$E \approx 1.812$

$\boxed{12.261 < \mu < 15.885}$

We are 95% confident that the true population mean wages for all people in the U.S. employed in the manufacturing industry is between \$12.26 and \$15.89.

(4) SACK of POTATOES: $\mu = 5.00$, $\sigma = 0.25$ lbs.

(a) $P(x > 4.90) = \text{normalcdf}(4.90, 1E99, 5.00, 0.25)$

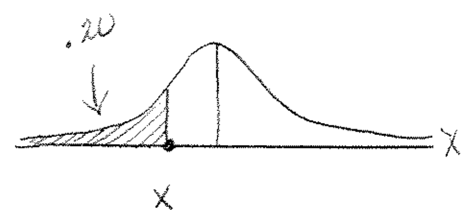
$\approx \boxed{0.655}$

(b) $P(\bar{x} < 4.90) = \text{normalcdf}\left(-1E99, 4.90, 5.00, \frac{.25}{\sqrt{10}}\right)$

$\approx \boxed{0.103}$

(c) $X = \text{invNorm}(.20, 5.00, .25)$

$\approx \boxed{4.79}$



(d) we want the sample size n for a 99% C.I.

$$n = \left[Z_{\frac{\alpha}{2}} \cdot \frac{\sigma}{E} \right]^2 \qquad n = \left[(2.576) \cdot \frac{0.25}{(.1)} \right]^2$$

≈ 41.47 round up

$\boxed{42}$

USE Program NMEAN also $\boxed{42}$

(5) $H_0: \mu = 36.7$ ← claim

$H_1: \mu \neq 36.7$

✓ Claim
✓ Data
✓ α
✓ TS
✓ CV, PV
✓ CON

$\alpha = 0.01 \qquad \frac{\alpha}{2} = 0.005$

Sample Data

$n = 50$

$\bar{x} = 32.1$

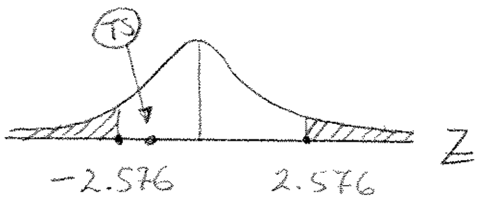
$S =$ NOT GIVEN

$\sigma = 14.2$ (SO USE Z Test Stat)

TEST STATISTIC

$$Z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} \qquad Z = \frac{32.1 - 36.7}{\frac{14.2}{\sqrt{50}}} \approx \boxed{-2.29}$$

CRITICAL VALUES



P-Value $\approx \boxed{0.022}$

P-Value > α, TS NOT in CRITICAL Region

$\boxed{\text{Fail to Reject } H_0}$

There is NOT sufficient evidence to reject the manager claim that the mean really is 36.7.

(6) (a) 4,000 * normalcdf(74, 1E99, 69, 2.8) ≈ $\boxed{148}$

(b) $P(105 < \bar{x} < 112)$ = normalcdf $\left(105, 112, 100, \frac{15}{\sqrt{20}}\right) \approx \boxed{0.068}$

(c) BEST POINT ESTIMATE $\bar{x} = \dfrac{(10.2+19.8)}{2} = \boxed{15}$

$E = \dfrac{(19.8 - 10.2)}{2} = \boxed{4.8}$

(d) TWO TAILED TEST.

P-Value = 2 * normalcdf(1.95, 1E99, 0, 1)

≈ $\boxed{0.051}$

(e) $\chi^2_L = \boxed{8.231}$ $\chi^2_R = \boxed{31.526}$

(f) USE PROGRAM $\boxed{\text{TESTSDEV}}$ for: $n = 22$

$s = 23$

TEST STAT: $\chi^2 \approx \boxed{14.170}$ $H_1: \sigma < 28$

P-Value ≈ $\boxed{0.138}$

$\boxed{\text{Fail to Reject } H_0}$

We must fail to reject the null BECAUSE a P-Value of 0.138 (almost 14%) is well above even a lenient alpha of 10%.