Q1. $\bar{x} \pm Z_c \frac{s}{\sqrt{n}}$

$25 \pm 1.96 \frac{3}{\sqrt{47}} = 25 \pm 1.96 \frac{3}{6.86} = 25 \pm 1.96 \times .437 =$

$25 \pm .857 = \underline{24.14 - 25.86}$

Q2. $\cancel{\bar{x} \pm Z_c \frac{s}{\sqrt{n}}}$

$p \pm Z_c \sqrt{\frac{p \cdot (1-p)}{n}}$ $\quad p = 138/300 = .46$

$.46 \pm 2.575 \sqrt{\frac{.46 \cdot (1-.46)}{300}} = \sqrt{\frac{.46 \times .54}{300}} = \sqrt{\frac{.248}{300}} =$

$\sqrt{.000828} = .0288$

$.46 \pm 2.575 \times .0288 = .46 \pm .074 = \underline{.386 - .534}$

Q3

A) $H_0: \underline{m \geq 2}$

$H_a: \underline{m < 2}$ WHERE $\underline{m}$ is average call connection time

B) $\frac{1.9 - 2}{\frac{.26}{\sqrt{50}}} = \frac{.26}{7.07} = \frac{-.1}{6.037} = \underline{-2.72}$

C) CALCULATED VALUE BY LOOKING UP STANDARD DISTRIBUTION TABLE AS EXPLAIND IN "MAKING SENSE OF DATA" pg76.

$-2.72 = \underline{.00326} \quad < 0.05$

D) THE PHONE COMPANY CAN MAKE CLAIM. WITH 95% CONFIDENCE AND ONLY 2.5% CHANCE OF EXTREME CASES BEING > 2.

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1.

A) $H_0: p \leq 90\%$

$H_a: p > 90\%$ WHERE p IS THE PERCENT OF CUSTOMERS PLEASED WITH THE SERVICE

B) $$z = \frac{p - \pi_0}{\sqrt{\frac{\pi_0(1-\pi_0)}{n}}} = \frac{.91 - .90}{\sqrt{\frac{.90(1-.90)}{100}}}$$

$$= \frac{.01}{\sqrt{\frac{.90 \times .1}{100}}} = \frac{.01}{\sqrt{.0009}} = \frac{.01}{.03} = 0.33$$

C) CALCULATED VALUE BY LOOKING UP STANDARD DISTRIBUTION TABLE AS EXPLAINED IN "MAKING SENSE OF DATA" pg 76

~~0.33 = .62930~~ 0.33 = 0.3707 EXAMINING LEFT TAIL FOR VALUES. α0.05

D) THE P-VALUE IS GREATER THAN THE HYPOTHESIS SCORE THERFORE THE BANK CAN NOT MAKE THE CLAIM

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A) $H_0: m1 \leq m2$

$H_a: m1 > m2$

WHERE m1 IS AVERAGE PLANT HEIGHT GROWN WITH FERTILIZER X AND WHERE m2 IS AVERAGE PLANT HEIGHT GROWN WITH FERTILIZER Y

B)

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = \frac{(.36 - .34) - (0)}{\sqrt{\frac{.035}{50} + \frac{.036}{50}}}$$

$$= \frac{.02}{\sqrt{.0007 + .00072}} = \frac{.02}{.038} = .526$$

$$S_p^2 = \frac{(50-1).035 + (50-1).036}{(50-1) + (50-1)} = \frac{1.715 + 1.764}{98}$$

$$S_p^2 = .0355$$

$$z = \frac{(.36 - .34) - (0)}{\sqrt{\frac{.0355}{50} + \frac{.0355}{50}}} = \frac{.02}{\sqrt{.0042}} = \frac{.02}{.037}$$

$z = .540$ $\alpha\ 0.05$

C) .29476

A) $H_0: p1 \geq p2$

$H_a: p1 < p2$

WHERE P1 IS THE PROPORTION OF DEFECTS WITH MUNUFACTURER A AND WHERE P2 IS THE PROPORTION OF DEFECTS WITH MANUFACTURER B

B) $p = \dfrac{X_1 + X_2}{n_1 + n_2}$ $\qquad p = \dfrac{7 \times 98}{12 + 195} = \dfrac{105}{207}$

$p = .507$

$P_1 = \dfrac{x_1}{n_1} = \dfrac{7}{12} = .583$

$P_2 = \dfrac{x_2}{n_2} = \dfrac{98}{195} = .503$

$$z = \frac{(.583 - .503) - (\pi_1 - \pi_2)}{\sqrt{.507(1 - .507)\left(\frac{1}{12} + \frac{1}{195}\right)}} = \frac{(.08) - (0)}{\sqrt{.507(.443)(.088)}}$$

$$= \frac{-.08}{\sqrt{.0197}} = \frac{-.08}{.14} = -.571$$

C) .28434 $\quad \alpha\, 0.05$

D) THE P VALUE IS LARGER ~~SMALLER~~ THAN THE HYPOTHESIS SCORE THEREFORE THE CLAIM CAN NOT BE MADE

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…7.

A) $H_0: d = 0$

$H_a: d \neq 0$ WHERE d IS THE DIFFERENCE IN WEAR BETWEEN THE TWO SETS OF GLOVES

B) $t = \dfrac{\bar{D} - \mu_D}{\frac{SD}{\sqrt{n}}} = \dfrac{0.34 - 0}{\frac{0.14}{\sqrt{40}}} = \dfrac{.34}{.02} = \underline{17}$

C) STANDARD NORMAL DISTRIBUTION TABLE DOESNT GO THAT LOW

VALUE IS $< .00003$, VIRTUALLY $\underline{0}$ $\alpha\ 0.05$

D) THE P VALUE IS SMALLER THAN THE HYPOTHESIS SCORE

THERFORE <u>THE CLAIM CAN BE MADE</u>

Q8

A) $H_0: d = 0$

$H_a: d \neq 0$ WHERE d IS THE DIFFERENCE IN ALLOY BETWEEN THE 4 SUPPLIERS

B)

CATEGORY		OBSERVED	EXPECTED	$(O-E)^2/E$
r= SATISFACTORY	, c= A		28	
r= UNSATISFACTORY	, c= A		2	
r= S	, c= B		27	
r= UNS	, c= B		3	
r= S	, c= C		29	
r= UNS	, c= C		1	
r= S	, c= D		26	
r= UNS	, c= D		4	

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B)

CATEGORY	O OBSERVED	E EXPECTED	$(O/E)^2/E$
r=S , C=A	28	27.5	.01
r=UNS, C=A	2	2.5	−.1
r=S , C=B	27	27.5	.01
r=UNS, C=B	3	2.5	.1
r=S , C=C	29	27.5	.08
r=UNS , C=C	1	2.5	−.9
r=S , C=D	26	27.5	−.08
r=UNS, C=D	4	2.5	.9
			+
			2.18

EXPECTED FORMULA

$E_{r,c} = \frac{r \times c}{n}$, r=S, C=A: $\frac{30 \times 110}{120} = 27.5$

, r=UNS, C=A: $\frac{30 \times 10}{120} = 2.5$

D)

$df = (r-1) \times (c-1) = (4-1) \times (2-1) = 3$

α .05 + df = 3.05 = 7.815

THE P-VALUE IS ~~[illegible]~~ GREATER THAN THE CHI SQUARE VALUE (7.815 > 2.18) THE CLAIM CAN NOT BE MADE < 0.05

MARCUS HOFFMAN

A) $H_0: d = 0$

$H_a: d \neq 0$ WHERE d IS THE DIFFERENCE BETWEEN THE 4 MACHINES

B) $n = 8$

$\bar{x}_i = \frac{\sum(x_i)}{n}$

$s_i^2 = \frac{\sum(x_i - \bar{x})^2}{n-1}$

MACHINE	1	2	3	4
n	8	8	8	8
$\bar{x}$	50.38	51	49.88	50.75
s_i^2	1.41	1.14	.98	1.64

$$MSW = \frac{(8-1)\times 1.41 + (8-1)\times 1.14 + (8-1)\times .98 + (8-1)\times 1.64}{(32-4)}$$

$$MSW = \frac{36.19}{28} = 1.3$$

$\bar{\bar{x}}$ = AVG OF MEANS = $\frac{50.38 + 51 + 49.87 + 50.75}{4}$

$\bar{\bar{x}} = 50.63$

$$MSB = \frac{\sum_{i=1}^{K} n_i(\bar{x}_i - \bar{\bar{x}})^2}{k-1} = \frac{(8\times(50.38-50.63)^2) + (8\times(51-50.63)^2) + (8\times(49.88-50.63)^2) + (8\times(50.75-50.63)^2)}{4-1}$$

$$= \frac{(8\times .06) + (8\times .13) + (8\times .56) + (8\times .006)}{3}$$

$$MSB = \frac{6.048}{3} = 2.02$$

B) continued...

$$F = \frac{MSB}{MSW} = \frac{2.02}{1.3} = 1.5$$

c) df within $= N - k = 32 - 4 = 28$

df between $= k - 1 = 4 - 1 = 3$

α confidence level $= .05$

df1(3) df2(28) = CRITICAL F STATISTIC = 2.9467

SINCE THE F STATISTIC IS LESS THAN THE CRITICAL VALUE THE CLAIM CAN NOT BE MADE