

SOLUTIONS

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(#27) The data are (this is how I will give you the information).

Categories $\Rightarrow$	Brown	Yellow	Red	Orange	Green	Blue	TOTAL
Proportion $\rightarrow$	.30	.20	.20	.10	.10	.10	1.00
OBSERVED $\rightarrow$	152	114	106	51	43	43	509
EXPECTED	152.7	101.8	101.8	50.9	50.9	50.9	509

- ① H_0 : The proportions listed are correct
 H_a : The proportions listed are NOT correct.

② $\alpha = .05$

③ $\chi^2 = \sum \frac{(O - E)^2}{E}$ d.f. = (# of categories - 1) = 6 - 1 = 5.

$$= \frac{(152 - 152.7)^2}{152.7} + \frac{(114 - 101.8)^2}{101.8} + \frac{(106 - 101.8)^2}{101.8} + \frac{(51 - 50.9)^2}{50.9} + \frac{(43 - 50.9)^2}{50.9} + \frac{(43 - 50.9)^2}{50.9}$$
$$= .003 + 1.462 + .173 + .0001 + 1.226 + 1.226$$
$$= 4.0901 \quad \text{d.f.} = 5$$

$\Rightarrow$ continued

→ cont.

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$\Downarrow$ cont. USE
Chi-square table
 ④ p-value: $1/10 = 0.10$

$$1.610 < 4.090 < 9.306$$

$$\Downarrow \quad \quad \quad \Downarrow \quad \quad \quad \Downarrow$$

$$.90 > p\text{-value} .10$$

NOTE: NEVER DOUBLE
FOR χ^2

⑤ Decision $.90 > p\text{-value} > .10 > .05$
 α

$\Rightarrow p\text{-value} > \alpha$
 $\Rightarrow$ Fail to Reject H_0

#3) a. The data are

CATEGORIES →	4	5	6	7	TOTAL
Proportion →	.125	.250	.3125	.3125	1.00
OBSERVED →	21	24	24	36	105
EXPECTED →	13.125	26.25	32.8125	32.8125	

① H_0 : The proportions listed are correct
 H_a : The proportions listed are NOT correct.

② $\alpha = .05$

② $\alpha = .05$

③ $\chi^2 = \sum \frac{(O - E)^2}{E}$ $d.f. = (\# \text{ of categories} - 1) = 4 - 1 = 3$

$$= \frac{(21 - 13.125)^2}{13.125} + \frac{(24 - 26.25)^2}{26.25} + \frac{(24 - 32.8125)^2}{32.8125} + \frac{(36 - 32.8125)^2}{32.8125}$$
$$= 4.725 + .193 + 2.367 + .310$$

continued

↓ continued

pg three

step

③ $\chi^2 = 7.595$ d.f. = 3

④ p-value:

$$\begin{array}{ccc} 6.251 & < & 7.595 < 7.815 \\ \downarrow & & \downarrow & \downarrow \\ .10 & > & p\text{-value} > .05 \end{array}$$

Do NOT
DOUBLE.

⑤ Decision:

$$.10 > p\text{-value} > .05$$

$\Rightarrow p\text{-value} > \alpha$
 $\Rightarrow$ Fail to Reject H_0

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#81 (a)

THE DATA: THIS IS HOW I WILL PRESENT THE DATA

	FEW	SOME	LOTS	TOTAL
MIDDLE	4/4.4	13/11.6	15/16	32
WORKING	5/4.6	11/12.4	18/17	34
TOTAL	9	24	33	66

① H_0 : INDEPENDENT

H_a : DEPENDENT

② $\alpha = .01$

③ $\chi^2 = \sum \frac{(o - e)^2}{e} = \frac{(4 - 4.4)^2}{4.4} + \frac{(13 - 11.6)^2}{11.6} + \frac{(15 - 16)^2}{16} + \frac{(5 - 4.6)^2}{4.6} + \frac{(11 - 12.4)^2}{12.4} + \frac{(18 - 17)^2}{17}$

d.f. = $(r - 1)(c - 1)$
 $= (2 - 1)(3 - 1)$
 $= (1)(2) = 2$

$= .036 + .169 + .063 + .035 + .059 + .059$

cont

↓ Cont

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$$\chi^2 = .520$$

$$\begin{aligned} d.f. &= (r-1)(c-1) \\ &= (2-1)(3-1) \\ &= (1)(2) \\ &= 2 \end{aligned}$$

④ p-value: $0.211 < 0.520 < 4.605$

$$\begin{aligned} &\downarrow \quad \quad \downarrow \quad \quad \downarrow \\ .90 &> p\text{-value} > .10 \end{aligned}$$

DO NOT DOUBLE. (NEVER FOR χ^2)

⑤ Decision:

$$.90 > p\text{-value} > .10 > .01$$

$$\Rightarrow p\text{-value} > \alpha$$

⇒ Fail to reject H_0

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Data:

WORK

		Y	N	TOTAL
U	Y	18	21	39
C		7.3	31.7	
T	N	25	152	174
I		32.7		
on	TOTAL	40	173	213



#83

Data:

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		WORRY		
		YES	NO	TOTAL
V	YES	18 / 7.3	21 / 31.7	39
	NO	22 / 32.7	152 / 141.3	174
TOTAL		40	173	213

- ① H_0 : independent
 H_a : dependent

② $\alpha = .01$

③ $\chi^2 = \sum \frac{(O - E)^2}{E}$ d.f. = $(r-1)(c-1) = (2-1)(2-1) = (1)(1) = \underline{1}$

$$= \frac{(18 - 7.3)^2}{7.3} + \frac{(21 - 31.7)^2}{31.7} + \frac{(22 - 32.7)^2}{32.7} + \frac{(152 - 141.3)^2}{141.3}$$

$$= 15.684 + 3.612 + 3.501 + .810 \quad \text{d.f.} = \underline{1}$$

$$= 22.607 \quad \text{d.f.} = \underline{1}$$

④ p-value

$$7.879 < 22.607 < \underline{\hspace{2cm}}$$

$$\Downarrow \quad \Downarrow$$

$$.005 > p\text{-value}$$

DO NOT DOUBLE

⑤ Decision

$$.01 > .005 > p\text{-value}$$

"
α

$p\text{-value} < \alpha \Rightarrow \boxed{\text{Reject } H_0}$