

Hw 4 244BU Answer Key

3. $H_0 = p_{ABC} = .29, p_{CBS} = .28, p_{NBC} = .25, p_{IND} = .18$

$H_a =$ The proportions are not $p_{ABC} = .29, p_{CBS} = .28, p_{NBC} = .25, p_{IND} = .18$

Expected frequencies: $300 (.29) = 87, 300 (.28) = 84$

$300 (.25) = 75, 300 (.18) = 54$

$e_1 = 87, e_2 = 84, e_3 = 75, e_4 = 54$

Actual frequencies: $f_1 = 95, f_2 = 70, f_3 = 89, f_4 = 46$

$$\chi^2 = \frac{(95-87)^2}{87} + \frac{(70-84)^2}{84} + \frac{(89-75)^2}{75} + \frac{(46-54)^2}{54}$$

$$= 6.87$$

$k - 1 = 3$ degrees of freedom

Using the χ^2 table with $df = 3, \chi^2 = 6.87$ shows the p -value is between .05 and .10.

Using Excel or Minitab, the p -value corresponding to $\chi^2 = 6.87$ is .0762.

p -value > .05, do not reject H_0 . There has not been a significant change in the viewing audience proportions.

11. H_0 : Type of ticket purchased is independent of the type of flight

H_a : Type of ticket purchased is not independent of the type of flight.

Expected Frequencies:

$e_{11} = 35.59 \quad e_{12} = 15.41$
 $e_{21} = 150.73 \quad e_{22} = 65.27$
 $e_{31} = 455.68 \quad e_{32} = 197.32$

Ticket	Flight	Observed Frequency (f_i)	Expected Frequency (e_i)	$(f_i - e_i)^2 / e_i$
First	Domestic	29	35.59	1.22
First	International	22	15.41	2.82
Business	Domestic	95	150.73	20.61

Business	International	121	65.27	47.59
Full Fare	Domestic	518	455.68	8.52
Full Fare	International	<u>135</u>	197.32	<u>19.68</u>
	Totals:	920		100.43

Degrees of freedom = $(3-1)(2-1) = 2$

Using the χ^2 table with $df = 2$, $\chi^2 = 100.43$ shows the p -value is less than .005.

Using Excel or Minitab, the p -value corresponding to $\chi^2 = 100.43$ is .0000.

p -value $\leq .05$, reject H_0 . Conclude that the type of ticket purchased is not independent of the type of flight.

23.
$$\mu = \frac{0(15) + 1(31) + 2(20) + 3(15) + 4(13) + 5(4) + 6(2)}{100} = 2$$

x	Observe d	Poisson Probabiliti es	Expected
0	15	.1353	13.53
1	31	.2707	27.07
2	20	.2707	27.07
3	15	.1804	18.04
4	13	.0902	9.02
5 or more	6	.0527	5.27

$\chi^2 = 4.95$

Degrees of freedom = $6 - 1 - 1 = 4$

Using the χ^2 table with $df = 4$, $\chi^2 = 4.95$ shows the p -value is greater than .10.

Using Excel or Minitab, the p -value corresponding to $\chi^2 = 4.95$ is .2925.

p -value $> .10$, do not reject H_0 . The assumption of a Poisson distribution cannot be rejected.