

<u>7.16</u>	Fetal	Side	Back	Stomach	None	
	391	257	156	89	107	observed
7	419. <sub>0</sub> → (410)	289. <sub>0</sub> (280)	139. <sub>0</sub> (130)	79. <sub>0</sub> (70)	119. <sub>0</sub> (110)	expected

$H_0$  vs.  $H_a$ : not  $H_0$

$$\chi^2 = \frac{(391 - 410)^2}{410} + \frac{(257 - 280)^2}{280} + \frac{(156 - 130)^2}{130} + \frac{(89 - 70)^2}{70} + \frac{(107 - 110)^2}{110}$$

$$= .88 + 1.89 + 5.2 + 5.16 + .082$$

$$= \underline{\underline{13.2}}, \quad df = 4 \implies p\text{-value} = .01 \approx 1\%$$

7.17

Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
6880	7982	9161	8941
.244 → 8044.192	.258 → 8505.744	.257 → 8472.776	.241 → 7945.288

Total:  
32,968

$$\chi^2 = \frac{(6880 - 8044.192)^2}{8044.192} + \frac{(7982 - 8505.744)^2}{8505.744} + \frac{(9161 - 8472.776)^2}{8472.776} + \frac{(8941 - 7945.288)^2}{7945.288}$$

$$= 168.5 + 32.2 + 55.9 + 125.8$$

$$= \underline{\underline{382}}, \text{ df} = 3, \text{ p} \approx 0$$

7.45

	Grades	Sports	Popular	
B	117	60	50	(227)
G	130	30	91	(251)
	247	90	141	(478)

(a)

$$\chi^2 = \frac{(247 - 159.3)^2}{159.3} + \frac{(90 - 159.3)^2}{159.3} + \frac{(141 - 159.3)^2}{159.3}$$

$$= \underline{\underline{80.53}}, \quad df = 2, \quad p\text{-value} = \underline{\underline{0}}$$

Grades	Spash	Poplar	
B	117.3	42.74	66.96
C	129.7	47.26	74.04
	247	90	141
			478

$$\frac{227}{478} = 47.499$$

$$\frac{251}{478} = 52.519$$

$$\left(\frac{227}{478}\right)(247) = 117.3$$

$$\chi^2 = \frac{(117 - 117.3)^2}{117.3} + \frac{(60 - 42.74)^2}{42.74} + \frac{(50 - 66.96)^2}{66.96} + \frac{(130 - 129.7)^2}{129.7} + \frac{(30 - 47.26)^2}{47.26} + \frac{(91 - 74.04)^2}{74.04}$$

$$= 21.5, \quad df = 2, \quad p = .000021$$