

Biometry, Math 2520

May 7, 2007

Final Exam

YOUR NAME:

After you get the test back, if you consider that something was incorrectly graded,

DO NOT WRITE ON YOUR TEST!

As clearly as possible write down your version of the story on a clean sheet of paper, attach it to your test, and give it back to your instructor for further consideration.

problem	points	score
1	20 pts	
2	10 pts	
3	15 pts	
4	20 pts	
5	15 pts	
6	20 pts	
TOTAL	100 pts	

1. In the U.S., over the 18 years from 1987-2004, there were 67 amusement ride fatalities, occurring with the following frequencies (Source: U.S. Consumer Product Safety Commission, DTHS and IPII):

Number of fatalities (Y)	Number of years (f)	fY	y	fy^2	Expected Poisson frequencies	Deviation from expectation
0	1	0	-3.72	13.85		
1	1	1	-2.72	7.41		
2	3	6	-1.72	8.90		
3	3	9	-0.72	1.56		
4	5	20	0.28	0.39		
5	2	10	1.28	3.27		
6	1	6	2.28	5.19		
7	1	7	3.28	10.74		
8	1	8	4.28	18.30		

$$\bar{Y} = 3.722 \quad s^2 = 4.09477 \quad CD = 1.100$$

Fill in the last two columns of this table. and calculate s^2 and the coefficient of dispersion. Perform a G-test for goodness of fit to determine if this data fits a Poisson distribution.

4. The following data exhibits some linear dependence. Calculate the regression coefficient; find a 95% confidence interval for it as well.

X	Y
1	7.22
4	13.8
6	19.2
7	23.4
11	31.8

5. The Mythbusters are testing whether toast “always” lands butter side up. They do this by dropping 48 slices each of buttered toast and unbuttered toast from the top of their building. The buttered side is marked, as is one side of each slice of unbuttered toast. The number of buttered slices landing marked side up is 29; for the unbuttered slices, 26 land marked side up. Use G-statistics to determine if there is homogeneity among the groups and if each group exhibits a 1:1 ratio. (Actual data from episode 28, March 9, 2005.)

6. The Mythbusters are testing if a helium-filled football will travel farther when kicked than a normal air-filled football. Using a kicking machine for uniformity, they make 60 kicks of each ball and measure (in yards) the distance traveled. Perform an analysis of variance to determine if there is any difference. (Estimates from episode 47, February 1, 2006.)

$$\text{Helium} \quad \bar{Y} = 69.4 \quad s^2 = 1.02$$

$$\text{Air} \quad \bar{Y} = 69.6 \quad s^2 = 1.01$$