p207 Ex 11A Qn 1

Score	1	2	3	4	Total
f_o	12	15	19	22	68
f_e	17	17	17	17	68

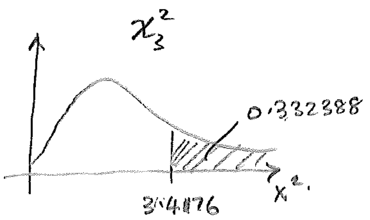
H_0: the observed data fits the discrete uniform distribution, $U(4)$

H_1 : data does not fit $U(4)$

Assume H_0 to be true $\qquad \alpha = 5\%$

one tail test

$$X^2 = \Sigma \frac{(f_o - f_e)^2}{f_e^2} = 3.41176$$



df = 3.

$P(X^2 > 3.41176) = 0.332388$

Hence as $0.33 > 0.05$, based on the 68 trials, we do not have evidence to reject H_0 and we conclude that the observed data fits a $U(4)$ distribution, and so the die is fair.

Ex11 A no. 2.

Score	1	2	3	4	5	6	Total
f_o	17	20	29	20	18	16	120.
f_e	20	20	20	20	20	20.	

H_0: Die is fair & fits discrete uniform distribution, $U(6)$

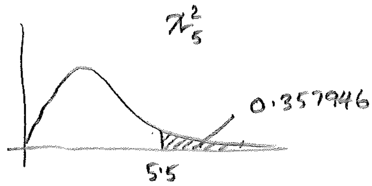
H_1: Die is not uniformally distributed

Assume H_0 to be true.

$\alpha = 5\%$, 1 tail test, df = 5.

$$X^2 = \sum \frac{(f_o - f_e)^2}{f_e} = 5.5$$

$$P(X^2 > 5.5) = 0.357946$$



so as $0.35 > 0.05$, we do not have evidence to reject H_0 and we conclude that the die is not biased, as it follows a $U(6)$ distribution

Ex 11A no. 3

Day	M	Tu	W	Th	F
f_o	125	88	85	94	108
f_e	100	100	100	100	100

H_0 : absences independent of day (distributed as discrete uniform $U(5)$)

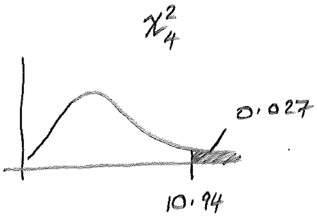
H_1 : absences not independent of day. (as not uniformly distributed)

Assume H_0 to be true.

$\alpha = 5\%$, one-tail test, $df = 4$

$\chi^2 = 10.94$

$P(\chi^2 > 10.94) = 0.027247$



as $0.027 < 0.05$, we have evidence to reject H_0, and so the absences are not $U(5)$ distributed.

Hence, on the basis of this observed data, there is evidence that the observed and expected frequencies are significantly different and that the absences are not independent of the day (we conjecture that there is a "I don't like Monday" phenomenon, courtesy of Bob Geldof and the Boomtown Rats).