MAT 2379 - Spring 2011
Assignment 7 : Solutions

8.21 (2 points) *Plan* II is better because we want that the units within a block to be more nearly alike. Under Plan I the effect of rain would be confounded with the varieties.

8.38 (3 points) a) This should be an experiment and it should be double blind

b) This should be an observational study. There is no need for blinding

c) This should be an observational study. The doctors who take the measurements should be not know the sexual orientation of the men.

10.1 (4 points) a) H_0 : the model is correct with population ratio 12:3:1
H_A :the model is correct

More specifically, $H_0 : P(white) = \frac{12}{16} = 0.75$, $P(yellow) = \frac{3}{16} = 0.1875$, $P(green) = \frac{1}{16} = 0.062\,5$

The expected frequencies are

White:	$205P(white)$	$= 205\,(0.75)$	$.= 153.\,75$
Yellow	$205P(yellow)$	$= 205\,(0.1875)$	$= 38.\,438$
Green	$205P(green)$	$= 205\,(0.062\,5)$	$= 12.\,813$

$\chi_s^2 = \frac{(155-153.\,75)^2}{153.\,75} + \frac{(40-38.\,438)^2}{38.\,438} + \frac{(10-12.\,813)^2}{12.\,813} = 0.691\,21$

With 3 categories, $df = 3-2 = 1$. From Table 9, P-value>0.20. The data is consistent with the model and we do not reject the null hypothesis.

Hence $0.001 < P-value < 0.01$ and we reject H_0

12.45 (6 points) a) The slope and intercept of the line are

$b_1 = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2} = \frac{-0.342}{0.1512} = -2.\,261\,9$

$b_0 = \bar{y} - b_1\bar{x} = 1.117 - (-2.\,261\,9)\,0.12 = 1.\,388\,4$

The fitted regression line is

$$\hat{Y} = 1.\,388\,4 - 2.\,261\,9x$$

c) $s_{Y|X} = \sqrt{SS\,(resid)/\,(n-2))} = \sqrt{0.2955/10} = 0.171\,9$
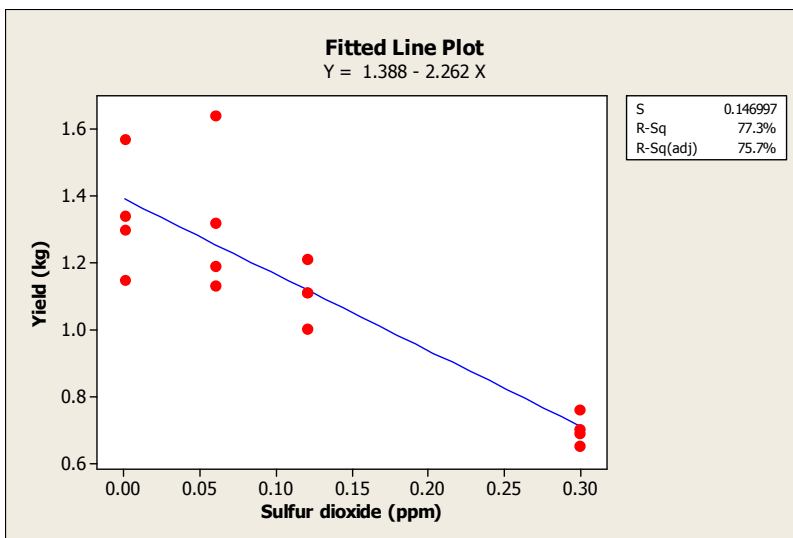
Total= 15 points

Figure 1: