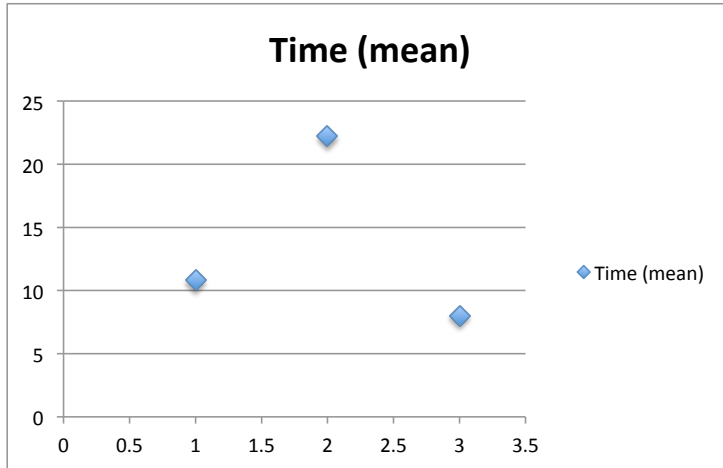


QSCI 482w HW9 Key

	Color	Time (mean)
1a	Red	10.8
	Green	22.2
	Black	8



1b	Color	Time (variance)
	Red	6.2
	Green	23.7
	Black	12.5

$sp^2 = 14.133$

1c Yes, the null hypothesis would likely be rejected by the anova test.
It looks like red and black door colors have similar times, and the green door a longer time

1d Homogeneity of group variances and independent observations

1e		Df	SS	MS	F	P
	color	2	565.7	282.87	20.01	0.000151 ***
	Residuals	12	169.6	14.13		

1f $\delta = \sqrt{2 * k * \phi^2 * MSE / n}$
about 9.5

2 Observed

	w/ disease	w/o disease	
Area 1	26	54	80
Area 2	20	72	92
Expected	46	126	172

			w/ disease	w/o disease
80*46/172	80*126/172	Area 1	21.4	58.6
92*46/172	92*126/172	Area 2	24.6	67.4

Chi-square uncorrected
 $(26-21.4)^2/21.4 + (54-58.6)^2/58.6 + (20-24.6)^2/24.6 + (92-67.4)^2/67.4$ 2.529

Yates
 $172(26*72 - 54*20) - 172/2)^2/(80*92*46*126)$ 2.0097

Cochran
 $172^3*4.5^2/(80*92*46*126)$ 2.4155

The corrected chi-squares are smaller than the uncorrected, being less likely to reject the null hypothesis.

However, in this case, none of the tests rejected H_0 , meaning the prevalence of disease is not different.

The probability of disease for the two areas combined would be 46/172, or 26.7 %

	Df	SS	MS	F	P
block	3	42.8	14.27	4.106	0.025 < P < 0.05
treatment	4	216.7	54.18	15.59	P < 0.005
block:treatment	12	41.7	3.47		

There is significant effects from block and treatment on mean root weight.

$$Sx1-x2 = \sqrt{MSE/2 (1/n1 + 1/n2)} = \sqrt{(3.47/2)(1/4 + 1/4)} \quad 0.931$$

	observed	expected		$(fi-fi-hat)^2/fi-hat$	
peanuts	269	5 5/10*500	250	$(250-269)^2/250$	1.444
hazelnuts	112	2 2/10*500	100	$(100-112)^2/100$	1.44
cashews	74	2 2/10*500	100	$(100-74)^2/100$	6.76
pecans	45	1 1/10*500	50	$(50-45)^2/50$	0.5
	500	10			10.144

H_0 : The machine mixes nuts in the 5:2:2:1 ratio

H_a : The machine mixes nuts in some other ratio

$$X-obs = 10.144$$

$$X_{0.5, 3} = 7.815$$

Reject H_0 . There is evidence to suggest that the machine does not mix nuts in the 5:2:2:1 ratio

5 Observed

Beach	Carcass condition				Total	
	F	B	M	D		
Seadrift		12	16	3	21	52
Limantour		3	2	9	16	30
RCA		12	9	2	9	32
Total		27	27	14	46	

Expected

Beach	Carcass condition				
	F	B	M	D	
Seadrift		12.3	12.3	6.4	21.0
Limantour		7.1	7.1	3.8	12.1
RCA		7.6	7.6	3.9	69.1

Ho. The proportion of carcasses in each condition class is not dependent on the beach

Ha. The proportion of carcasses in each condition class depends on the beach

X-obs = 22.844

X-crit = 12.592

Reject Ho. There is a relationship between beach and carase conditions

