

Practice Set 20 Nonparametric Hypothesis Testing of Nominal Data

1. Darin feels 20% of the 9-mg part defects are produced by the first shift, 30% by the second shift, and 50% by the third shift. Do an .01 level of significance test to determine whether this sample data follows Darin's proposed distribution. People using statistics software do not have to fill out the second chart.

Analysis of Defects				
	Shift 1	Shift 2	Shift 3	Totals
Shift defects, f_o	6	11	23	40
Expected defects, f_e	8	12	20	40

Shift	f_o	f_e	$f_o - f_e$	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
Shift 1	6	8	-2	4	4/8 = .50
Shift 2	11	12	-1	1	1/12 = .08
Shift 3	23	20	<u>3</u>	9	9/20 = <u>.45</u>
Totals			0		$\chi^2 = 1.03$

- H_0 : defects follow Darin's distribution.
 H_1 : defects do not follow Darin's distribution.
- The significance level is .01.
- Chi-square is the test statistic.
- The decision rule:
 If χ^2 from the test statistic is beyond the critical value, the difference is high and the null hypothesis is rejected.
- Apply the decision rule.

$$df = k - 1 = 3 - 1 = 2 \rightarrow \chi^2 = 9.21$$

Accept H_0 because $1.03 < 9.21$.
 Defects follow Darin's distribution.