Problem 1. A researcher selects a sample of 50 subjects in each of three categories of hair color (redhead, brunette, or blonde) who are about to undergo mandibular molar extraction. The standard initial dose of anesthetic is administered, and the resulting anesthesia of each patient was classified as satisfactory or unsatisfactory, based upon standard criteria.

The following table was constructed from the results

	Clinical Effectiveness		
	Satisfactory	Not Satisfactory	Total
Redhead	30	20	50
Brunette	41	9	50
Blonde	37	13	50

a. Is this considered a chi-square test of independence or homogeneity?

b. What is the value of the χ^2 statistic?

c. How many degrees of freedom are associated with this test?

d. What is the p-value associated with this test?

This can be computed in R with the `pchisq` function. For example, on slide 10 in the notes, we had a test statistic of 1.60 with 2 degrees of freedom. To compute this p-value, we would use

```
> ## value of the computed statistic
> statistic <- 1.60
>
> ## degrees of freedom
> dof <- 1
>
> ## Find p-values
> 1 - pchisq(statistic, dof)
[1] 0.2059
```

e. What is the smallest expected value for the table above? Is the chi-square test valid in this case? Why or why not?

f. Interpret and state the conclusions of this study