

1. Hursting *et al.* (1993 *Clinical Chemistry* 39:683) found that prothrombin fragment concentrations depended on age, sex, and smoking status in 357 healthy individuals. Assign symbols to variables. Assuming no interaction terms, write a general linear model corresponding to their analysis.

Name	Symbol
_____	_____
_____	_____
_____	_____
_____	_____

Source	df

GLM _____ = _____

Complete the first two columns of the ANOVA table (above).

2. For a 2 allele locus we let p = frequency of one allele in the parental generation, and $q = 1 - p$ = the frequency of the other allele. At Hardy Weinberg equilibrium, the expected proportion of homozygous and heterozygous offspring is given by

$$\hat{p} = (p+q)^2 = (p^2 + q^2) + 2pq$$

where $(p^2 + q^2)$ is the expected frequency of homozygous offspring
 $2pq$ is the expected frequency of heterozygous offspring.

For 1000 offspring, compute the expected proportion (\hat{p}) of homozygous and heterozygous offspring at Hardy-Weinberg equilibrium, when $p = 0.5$ in the parents. Compute the expected frequency $\hat{f} = 1000 \hat{p}$.

$\hat{p} =$ _____	homozygous	$\hat{f} =$ _____
_____	heterozygous	_____

3. Compute the goodness of fit G for the following frequencies of offspring relative to Hardy -Weinberg equilibrium with $p = 0.6$ in the parents.

$G = 2 \sum f \ln(f/\hat{f})$ where \hat{f} is the value expected from theory.

Expected \hat{f}	Observed f	
<u>48</u>	<u>50</u>	heterozygous
<u>52</u>	<u>50</u>	homozygous