AP Biology

Name _____

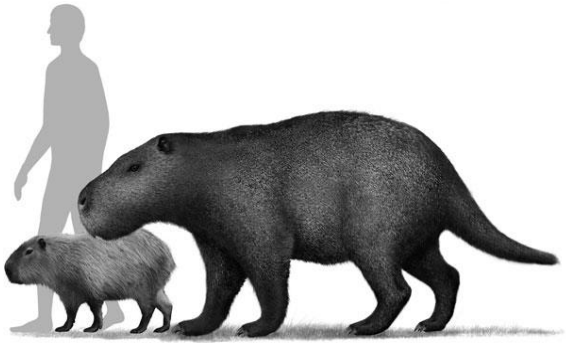
Date _____

Hardy-Weinberg & Chi-Squared Tests

In the year 2374, humans finally developed the technology necessary for time travels. You are a scientist interested in the population genetics of extinct animals. Taking advantage of this technological advance, you decide to go to the past 8 million years to conduct a field work in **Venezuela** to study a population of *Phoberomys pattersoni*, the world's largest extinct rodent weighing approximately 700 kg (1500 lb) and looking vaguely like a giant guinea pig. The coat color of this rodent varies between tan (dominant) and brown (recessive). Assume the population is in Hardy-Weinberg equilibrium. You observed 336 tan *Phoberomys* and 64 brown *Phoberomys* during your study.

a) What is the frequency of the homozygous recessive genotype?

b) What is the allelic frequency of the dominant (tan) allele in the population?



c) Of the animals you observed, how many were heterozygous?

You make another trip to **Venezuela** and this time you observe 650 animals.
d) How many of the 650 animals would you expect to be tan, assuming the population is still in Hardy-Weinberg equilibrium?

e) How many of these tan animals are homozygous for the dominant allele?

f) How many of these 650 animals would you expect to be brown, assuming the population is still in Hardy-Weinberg equilibrium?

g) As you observe the animals, you count 200 brown *Phoberomys* and 450 tan. Conduct a chi-square test to determine if your observations are significantly different from what you expect.

	Observed	**Expected**	**$(O-E)^2$**	**$(O-E)^2/E$**
Tan	450			
Brown	200			
			Total:	

h) What does your result in #7 mean in terms of the genetic composition of this population of *Phoberomys*?