

Name _____

10 points

Genetics 301 - Section 1

Assignment #5

In garden peas, Pisum sativum, purple x yellow seed pods (unripe) yields an F₁ all purple. The F₂ consisted of the data below. What is the most likely mode of inheritance? Test the data by X².

	<u>observed</u>	<u>expected</u>	<u>deviation</u>	<u>deviation²</u>
purple	269			
orange	83			
green (normal)	106			
yellow	22			

Hypothesis:

$$X^2 = \frac{d^2}{e} =$$

df=

P

The data do not support the hypothesis which is, therefore, accepted rejected.
(Correct this statement.)

X² value for 5% level of significance

For 1 df = 3.84

2 df = 5.99

3 df = 7.82

4 df = 9.50

22 April 70

Name _____

GENETICS 301 Section 2

ASSIGNMENT

20 points

In cattle the normal horned condition has been considered a simple recessive to polled. In a randomly mating herd, 72 animals are horned out of a total of 800. There are 273 animals observed to have "scurs" (small deformed horns). Is this statistically consistent with the notion that the 273 represent the heterozygotes? Use direct gene count, Hardy-Weinberg rules and χ^2 .

$$\chi^2 = \sum \frac{d^2}{e}$$

χ^2 value for 5% level of significance for

1 df	= 3.84
2 df	= 5.99
3 df	= 7.82
4 df	= 9.5

Name _____

Jan 71

Genetics 301 Section II

20 points

Assignment #2

In Hereford cattle the white face pattern is considered a simple dominant to solid (self) color. Yet in mixed herds many "brockle" faces appear (patches of color in the white face). In a random mating grade herd, 36 cattle were solid color, 128 had brockle faces, and 236 were white faced. Do you think brockle faces represent the heterozygotes? Use direct gene count and X^2 .

Name _____
Genetics 301 Section 2

Assignment #2

26 Jan 72
20 points

In cattle the normal horned condition has been considered a simple recessive to polled. In a randomly mating herd, 72 animals are horned out of a total of 800. There are 303 animals observed to have "scurs" (small deformed horns). Is this statistically consistent with the notion that the 303 represent the heterozygotes? Assign appropriate gene symbols, use direct gene count, Hardy-Weinberg rules, and X^2 .

Name _____

Oct 72

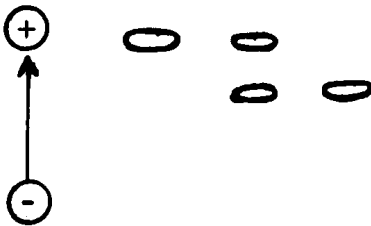
Gen. 301 Section 2

Assignment #2

20 points

A random sample of Shetland ponies in the U.S.A. exhibited three albumin band types in starch gel electrophoresis. There is too little family data for Mendelian analysis. What kind of inheritance is most likely? Test your hypothesis by χ^2 .

Observed albumin types



type	A	AB	B
	35	134	84

Name _____

Oct 72

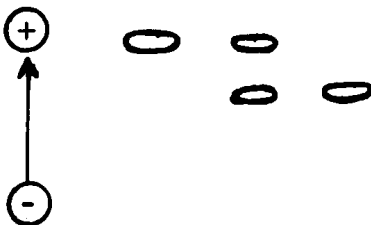
Gen. 301 Section 2

Assignment #2

20 points

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Observed albumin types

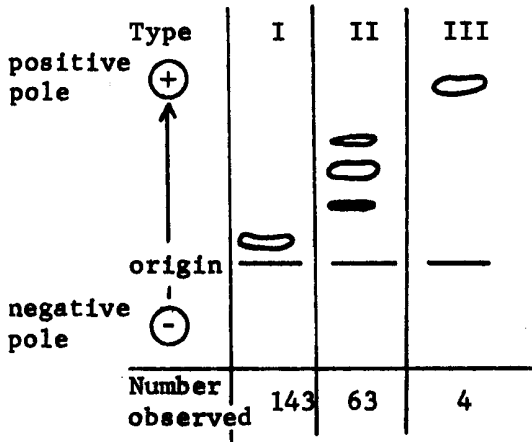


type	A	AB	B
	35	134	84

Homework II

In extracts from the testes of pigeons, *Columba livia*, lactate dehydrogenase isozymes are revealed by starch gel electrophoresis to show three phenotypes. Those bands showing polymorphism by using 0.5M $\bar{\alpha}$ -hydroxyvalerate are diagrammed below with the observed frequency for feral pigeons of Washington, D.C. (Zinkham, Blanco, and Kupchik; 1964, Science 144:1353-1354).

What is the probable mode of inheritance? Is the population sampled in equilibrium?



The X^2 at the 5% level of significance.

- = 3.84 for 1 df
- = 5.99 for 2 df
- = 7.82 for 3 df
- = 9.48 for 4 df
- = 11.07 for 5 df

Name _____

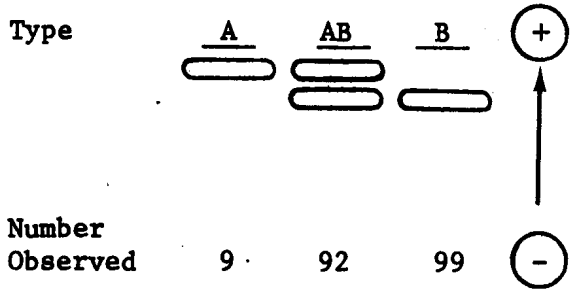
26 Jan 77

Genetics 340 Section 2

Homework II

due 31 Jan 77 (20 points)

In thoroughbred horses, a sampling of serum albumin types exhibited 3 phenotypes of gel electrophoresis. Family data is insufficient for Mendelian analysis. What is the probable type of inheritance? Is the sampled population in equilibrium? Test your hypothesis by X^2 .



Name _____

25 Apr 77

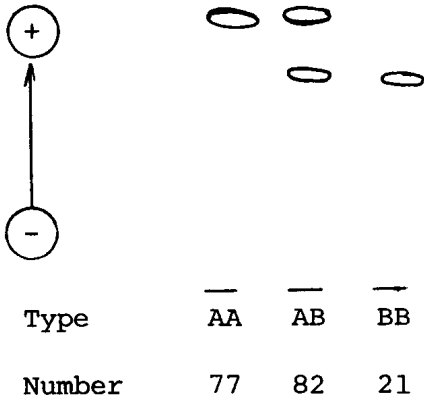
Homework II

due 29 Apr 77 (20 points)

In humans, Homo sapiens, the acetylator genetic system is concerned with rapid versus slow inactivation of Isoniazid (INH), a "miracle" drug for the treatment of tuberculosis, if it is not inactivated too fast. Family data is too sparse for Mendelian analysis, but population samples are available. Actual data of the Aino population of Japan are given in the results below. What is the probable type of inheritance? Is this population in equilibrium? Test your hypothesis by X^2 .

Inactivators	Number Observed
Rapid	44
Intermediate	31
Slow	11

In Rumania egg albumen polymorphisms in chickens was tested by starch gel electrophoresis on rare breeds (Furtunescu, et al., 1974, First World Congr. on Gen. Applications to Livestock Production). Ovoglobulin exhibited 3 phenotypes in 180 hens of the Sxh-U strain as noted below.
State the most likely mode of inheritance, and test the data by χ^2 .



Name _____

27 Jan 81

due 3 Feb 81 (20 points)

Genetics 340 Section 2

Homework II

There were 233 Semai Malayan aborigines tested for hemoglobin type in gel electrophoresis (Lewis et al. 1973). Three phenotypes were distributed as below. What is the probable type of inheritance? Is the population in equilibrium? Test your hypothesis by χ^2 .

<u>Type</u>	<u>Number Observed</u>
Hb-A	151
Hb-AE	68
Hb-E	14

Name _____

17 April 81

Genetics 340
Section 2

Homework II

due 22 April
(20 points)

In bream fish, Abramis brama, three phenotypes of lactate dehydrogenase (LDH) were found in starch gel electrophoresis as given below (Valenta, 1978, Anim. Blood Grps biochem. Genet. 9:139). Is this population in equilibrium? Test your hypothesis by χ^2 .

<u>Type</u>	<u>Number Observed</u>
LDH-C ^a	6
LDH-C ^{ab}	32
LDH-C ^b	24

Name _____

28 Oct. 81

Genetics 320
Section 1

Homework II

Due 4 Nov. 81
(20 points)

The red fox, Vulpes vulpes, in Alaska exhibits three major color phases, black, a blackish "cross" over the back and shoulders, and the wild type red. The three phenotypes occurred on Kodiak island in the frequencies listed below, according to early 19th century fur station records (Borodin, 1981, J. Hered. 72:343).

Is this population in equilibrium? Test your hypothesis by χ^2 .

	<u>Number observed</u>
Black	177
Cross	320
Red	231

Name _____

22 March 82

Genetics 320
Section A

Homework II

Due 26 March 82
(20 points)

Three phenotypes were found in humans for the enzyme system glyoxalase I of red cells. Researchers tested 1,220 unrelated adults in Denmark with the results indicated below.

Is this population in equilibrium? Test your hypothesis by χ^2 .

<u>Type</u>	<u>Number</u>
1	240
2-1	572
2	408
	<hr/> 1,220

Name _____

1 July 82

Genetics 320

Homework II

Due 7 July 82
(20 points)

The R'-S' blood type system in Ayrshire cattle exhibits three phenotypes as listed below. State the most likely mode of inheritance and test the hypothesis by χ^2 . Is this population in equilibrium?

<u>Type</u>	<u>Number</u>
R' R'	6
R' S'	66
S' S'	159

Name _____

25 Oct 82

Genetics 320

Homework II

Due 1 Nov 82

(20 points)

The R'-S' blood type system in Aberdeen Angus cattle exhibits three phenotypes as listed below. State the most likely mode of inheritance and test the hypothesis by χ^2 . Is this population in equilibrium?

<u>Type</u>	<u>Number</u>
R'R'	11
R'S'	94
S'S'	74

Name _____

5 July 83

due 8 July 83

Homework II

20 points

In a crustacean, Daphnai magna, malic dehydrogenase variants were detected by polyacrylamide gels. A population at Harlton, England exhibited 3 phenotypes with the numbers listed below in the month of June. What is the probable type of inheritance? Is this population in equilibrium? Test your hypothesis by χ^2 .

	<u>Numbers Observed</u>
Fast	97
Fast & Medium	124
Medium	<u>42</u>

Name _____

23 Mar 84

due 28 Mar 84

20 points

Homework II

In a crustacean, Daphnia magna, malic dehydrogenase variants were detected by polyacrylamide gels. A population at Harlton, England exhibited 3 phenotypes with the numbers listed below in the month of August. What is the probably type of inheritance? Is this population in equilibrium? Test your hypothesis by χ^2 .

	<u>Numbers Observed</u>
Fast	166
Fast & Medium	253
Medium	<u>41</u>

Name _____

22 March 85

Due 29 March 85

Homework II

20 points

In a crustacean, Daphnai magna, malic dehydrogenase variants were detected by using polyacrylamide gels. A population at Harlton, England exhibited 3 phenotypes with the numbers listed below in the month of October. What is the probable type of inheritance? Is this population in equilibrium? Test your hypothesis by χ^2 .

	<u>Numbers Observed</u>
Fast	<u>103</u>
Fast & Medium	247
Medium	<u>18</u>

Name _____

21 March 86

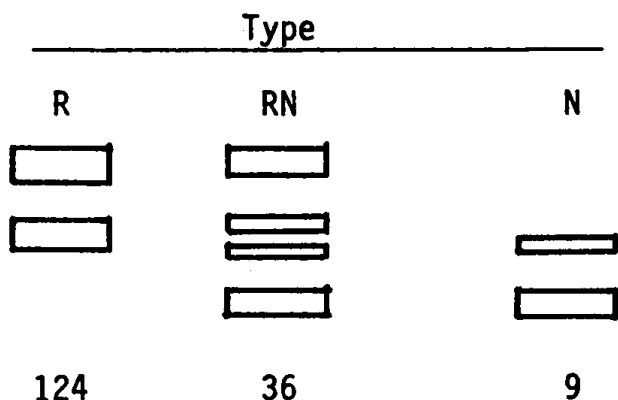
Genetics 320
Section B

Homework II

Due 28 March 86
(20 points)

Three phenotypes were found in rats, *Rattus rattus*, for serum transferrin. Electrophoretic results are summarized below. What is the simplest genetic hypothesis to explain the data?

Is this population in equilibrium? Test your hypothesis by χ^2 .



Name _____

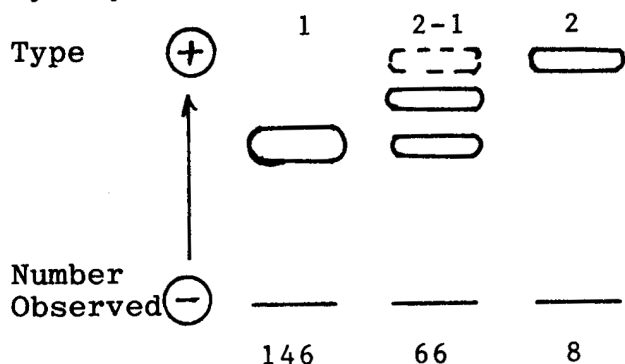
10 July 86

Genetics 340

Homework II

due 16 July 86 (20 pts.)

In Seattle, Washington the red cell enzyme glutamic-pyruvic transaminase showed 3 phenotypes in electrophoresis tests for Afro-Americans as given below (Chen and Giblett Sci. 173:148). What is the probable type of inheritance? Is this population in equilibrium? Test your hypothesis by χ^2 .



Name _____

20 Mar 87

due 27 Mar 87

Homework II

20 points

In hogs there are 3 phenotypes of lipoprotein allotypes (Gen. 113 Rapacz et. al. 1986). A Chester White population exhibited the frequencies indicated below.

What is the probable type of inheritance? Is this population in equilibrium? Test your hypothesis by χ^2 .

<u>Type</u>	<u>Numbers Observed</u>
Lpr 1	3
Lpr 1,2	49
Lpr 2	243

Name _____

25 Mar 88

Genetics 320

Due 30 Mar 88
(20 points)

Homework II

In goats, Capra hircus, angora (long hair) variation exhibits three phenotypes. Herds sampled in France yielded the data below. What is the probable type of inheritance?

Is this population in equilibrium? Test your hypothesis by χ^2 .

<u>phenotype</u>	<u>Number</u>
Short	329
Medium	130
Long	30

Name _____

21 Oct 88

Genetics 320

Homework II

Due 28 Oct 88

In 1978 Ranzam et al. reported the results (see below) of testing a random sample of people in Milan, Italy for the polymorphic enzyme esterase D. State the most likely mode of inheritance, and test the data by χ^2 .

<u>Type</u>	<u>Number</u>
1	413
2-1	124
2	12

Name _____

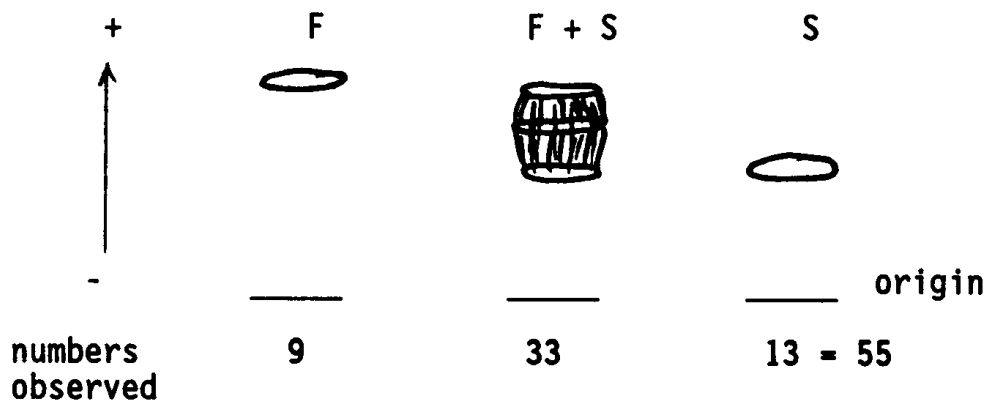
24 Oct 90

due 31 Oct 90

20 points

Homework II

Hessian flies, mayetiola destructor, are a wheat pest. In Garvin county, Oklahoma, the isocitrate dehydrogenase (IDH) enzyme system show 3 phenotypes in gel electrophoreses much as indicated below.



Name _____

25 March 1991

Genetics 340
Section 2

Homework Problem II

20 points

In sheep, *Ovis aries*, a mutant condition affects the size of the outer ear. A neglected flock of sheep have been breeding at random for six years. They exhibit the frequency of ear types given below. What is the probable mode of inheritance? Is the flock in equilibrium? Test data by χ^2 .

<u>Ear condition</u>	<u>Number Observed</u>
normal	156
short ear	201
no external ear	43

Name _____ Genetics 320

Homework II 20 points
25 March 92
due 1 April 92

The Florida tree snail, *Liguus fasciatus*, is an extreme example of a polytypic species with at least 58 morphological varieties. Nevertheless, only one allozyme system of 34 studied was variable-- the glucose-phosphate isomerase, Gpi, system. From the Pinecrest 16 locality of Southern Florida the variety *walkeri* had the following distribution of fast versus slow bands of the Gpi system. What is the most likely mode of inheritance? Test the data by X^2 . Comment?

+	-----	-----	
		-----	-----
-	-----	-----	-----
	F	FS	S
	45	59	154