Chi-Square Assignment

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Chi-Square Assignment Questions

1. A poker-dealing machine is supposed to deal cards at random, as if from an infinite deck.

In a test, you counted 1600 cards, and observed the following:

Spades 404
Hearts 420
Diamonds 400
Clubs 376

Could it be that the suits are equally likely? Or are these discrepancies too much to be random?

2. Same as before, but this time jokers are included, and you counted 1662 cards, with these results:

Spades 404
Hearts 420
Diamonds 400
Clubs 356
Jokers 82

a. How many jokers would you expect out of 1662 random cards? How many of each suit?

b. Is it possible that the cards are really random? Or are the discrepancies too large?

3. A genetics engineer was attempting to cross a tiger and a cheetah. She predicted a phenotypic outcome of the traits she was observing to be in the following ratio 4 stripes only: 3 spots only: 9 both stripes and spots. When the cross was performed and she counted the individuals she found 50 with stripes only, 41 with spots only and 85 with both. According to the Chi-square test, did she get the predicted outcome?

4. In the garden pea, yellow cotyledon color is dominant to green, and inflated pod shape is dominant to the constricted form. Considering both of these traits jointly in self-fertilized dihybrids, the progeny appeared in the following numbers:

193 green, inflated
184 yellow constricted
556 yellow, inflated
61 green, constricted

Do these genes assort independently? Support your answer using Chi-square analysis.

5. A department store, A, has four competitors: B,C,D, and E. Store A hires a consultant to determine if the percentage of shoppers who prefer each of the five stores is the same. A survey of 1100 randomly selected shoppers is conducted, and the results about which one of the stores shoppers prefer are below. Is there enough evidence using a significance level $\alpha = 0.05$ to conclude that the proportions are really the same?

Store	A	B	C	D	E
No of Shoppers	262	234	204	190	210