Chisquare Assignment:-

2) Spades 404
Hearts 420
diamonds 400
clubs 356
Jokers 82

pack of 1662 cards

H_0 = cards are random
H_a = cards aren't random

probability of getting a joker in pack of 54 cards is $2/54 = 0.037$

then for 1662 cards → 0.037×1662
$= 61.494 \simeq 62$

So here ~~expect.~~ expected jokers in pack of 1662 cards is 62

	expected	observed	X^2
Spades	400	404	$16/400$
Hearts	400	420	$400/400$
Diamonds	400	400	0
Clubs	400	356	$1936/400$
Jokers	62	82	$400/62$

Spades = 0.04
Clubs = 4.84
Jokers = 6.45

$df = 4$

$\chi^2_{critical}$ @ 0.05 = 9.488

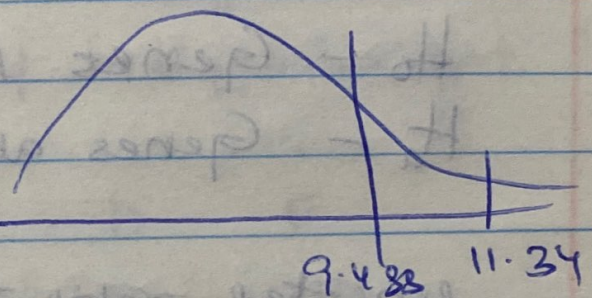
$\chi^2_{observed} = 0.04 + 4.85 + 6.45$

$= 11.34$

in the tail region

∴ reject Null

∴ Cards aren't randomly picked.



9) 4 stripes (expected) | 50 stripes (observed)
3 spots | 41 spots
9 both stripes & spots | 85 both stripes & spots

$$\chi^2_{obs} = \frac{(50-4)^2}{4} + \frac{(41-3)^2}{3} + \frac{(85-9)^2}{9}$$

$$= \frac{46^2}{4} + \frac{38^2}{3} + \frac{76^2}{9} \Rightarrow \chi^2_{crit} \text{ @ } 0.05 \text{ \& } 2df$$

$= 5.991$

The above ~~table~~ is falls in tail → reject H_0

∴ She didn't get the expected outcome

4) Green Inflated 193
yellow constricted 184
yellow Inflated 556
Green cons. 61

total observed = 994

H_0 - Genes Assorted Independently
H_a - Genes aren't assorted independently.

expected ratio ⇒ 9:3:3:1

~~expected total = a~~

$\frac{9}{16} \times 994 = 559$

$\frac{3}{16} \times 994 = 186$

$\frac{3}{16} \times 994 = 186$

$\frac{1}{16} \times 994 = 62$

	obs.	exp.	χ^2
Green Inf	193	186	$\frac{(193-186)^2}{186}$
yellow cons.	184	186	$\frac{(184-186)^2}{186}$
Yellow inf	556	559	$\frac{(556-559)^2}{559}$
Green cons.	61	62	$\frac{(61-62)^2}{62}$

$= 0.26 + 0.02 + 0.016 + 0.016$

$\chi^2_{obs} = 0.312$

$\chi^2_{critical}$ @ 0.05, df = 3 $\Rightarrow$ 7.815

$0.312 < 7.815$

Accept the Null Hypothesis

∴ Genes are assorted independently.

5)

Store	A	B	C	D	E
obs. shoppers	262	234	204	190	210
exp. shoppers	220	220	220	220	220

$$\chi^2_{obs} = \frac{(262-220)^2}{220} + \frac{(234-220)^2}{220} + \frac{(204-220)^2}{220} + \frac{(190-220)^2}{220} + \frac{(210-220)^2}{220}$$

$$= 8.01 + 0.89 + 1.16 + 4.09 + 0.45$$

$$= 14.6$$

χ^2_{crit} @ 0.05, 4df = 9.488

$14.6 > 9.488$ (falls in tail region)

Hence reject H_0

∴ proportions aren't same.

(Shoppers don't prefer all five stores are same)