CIMT Statistics p192 Ex 10A

1. each trial, P(pick odd one out) = $\frac{1}{3}$.

H_0: picking at random $(p=\frac{1}{3})$

H_1: can detect the odd one out $(p>\frac{1}{3})$

Assume H_0 to be true. $\alpha = 5\%$, one-tail test

let X = no. times correctly pick odd one out

$X \sim B(7, \frac{1}{3})$

p-value $= P(X \geq 5)$

$= 0.045267$ from binomCdf$(7, \frac{1}{3}, 5, 7)$

as p-value < 5% we are in critical region

So we have evidence to reject H_0

We conclude that there is sufficient evidence to back up her claim of being able to tell margerine from butter.

2.

H_0 : equally likely men/women as section head $(p=\frac{1}{2})$

H_1 : women are being discriminated against $(p<\frac{1}{2})$

Assume H_0 to be true

$\alpha = 5\%$, 1 tail test

let X = no. section heads who are women.

under H_0, $X \sim B(10, \frac{1}{2})$

p-value $= P(X \leq 2)$

$= 0.054688$ from binomcdf $(10, \frac{1}{2}, 0, 2)$

$> 5\%$.

Hence we are not in critical region and we donot have evidence to reject H_0

We therefore conclude the we don't have evidence that women are being discriminated against.

3. let X = no. correctly identified suits.

$X \sim B(10, p)$

H_0 : no ESP $(p = \frac{1}{4})$

H_1 : ESP present $(p > \frac{1}{4})$

Assume H_0 to be true

$\alpha = 5\%$, 1 tail test

under H_0, $X \sim B(10, \frac{1}{4})$

p-value $= P(X \geq 7)$

$= 0.003506$ from binomcdf$(10, \frac{1}{4}, 7, 10)$

< 0.05

Hence we do have evidence to reject H_0 and conclude that there is evidence for ESP on the results of this one experiment.