

Unit 6 *Hypothesis Testing*

Text Answers

6.1 Forming a Hypothesis

1. $p(5, 6 \text{ or } 7) = 0.045 < 0.05$
So there is sufficient evidence to back up her claim.
2. $p(2, 1 \text{ or } 0) = 0.167 > 0.05$
Hence not sufficient evidence at 5% for evidence of discrimination against women.
3. $p(7, 8, 9 \text{ or } 10) = 0.035 < 0.05$
Evidence at 5% level that there is ESP.
4. (a) Using tables for the Binomial Distribution,

$$p(X \geq 16) = 1 - p(X \leq 15) = 0.0059 < 0.05$$
Hence at 5% level, this is significant and we accept that cats really do prefer Whiskers.
- (b) Using tables,

$$p(X \geq 15) = 1 - p(X \leq 14)$$

$$= 0.0207 < 0.05$$

$$p(X \geq 14) = 1 - p(X \leq 13)$$

$$= 0.0577 > 0.05$$

For $n = 20$, critical values are 15, 16, 17, 18, 19 or 20; hence 16 out of 20 is significant
However, for $n = 10$, the critical values are 9 or 10, that is 8 out of 10 is not significant.

6.2 The Sign Test

1. $p(6 \text{ or more improvements}) = 0.145 > 0.05$
- not significant at 5%.
2. $p(9 \text{ or more improvements}) = 0.073 > 0.05$
- not significant at 5%.
3. $p(7 \text{ or more improvements}) = 0.090 > 0.05$
- not significant at 5%.
4. $p(4 \text{ or less}) = 0.3770$ so clearly not sufficient evidence to suggest that 'Super Grade' fuel gives better results.
5. $p(6 \text{ or more improvements}) = 0.0625 > 0.05$
- not significant at 5%.