Section 1: Introducing hypothesis testing

Crucial points

1. **Use the correct notation for stating hypotheses**
   Set up the hypothesis test carefully, using the correct notation.
   First state the definition of p. There is often a mark given for this.
   e.g.   Let p be the probability of getting a head.
   $$H_{0:}\, p = \tfrac{1}{2}$$
   $$H_{1:}\, p < \tfrac{1}{2}$$

   [NOT $H_0 = 0.2$, or $P(X = 0.2)$]

2. **Remember to test a region of probabilities**
   Always work out a region of probabilities (a tail), rather than a point.
   $P(X \le 3)$ not $P(X = 3)$, for example.

3. **Use the alternative hypothesis for deciding the region**
   Use the alternative hypothesis to help you decide on the region.
   If $H_{1:}\, p < \tfrac{1}{2}$ then you will calculate $P(X \le r)$
   If $H_{1:}\, p > \tfrac{1}{2}$ then you will calculate $P(X \ge r)$

4. **Show your calculations clearly**
   Show clearly what you are trying to calculate. This is much better than
   a list of fractions and decimals that appears to anybody else randomly
   ordered!
   e.g. $P(X \ge 4) = 1 - P(X \le 3) = 1 - 0.6477 = 0.3523$

5. **Make sure that you compare the probability with the significance level**
   You must do this explicitly. For example, $P(X \le 2) < 0.05$, so reject H_0.

6. **Once you have accepted / rejected H_0, give your conclusion in words**
   Decide whether you are to accept or reject H_0 but then put a final
   conclusion in words, answering what was requested in the question.
   Do not state that this "proves" anything but use wording like "the
   evidence suggests that…"

7. **Use at least 3 significant figures when using decimals**
   If using decimals work to at least 3 significant figures, to avoid rounding
   errors. Where possible use exact numbers until the end of the
   calculation.

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