# Year 9 Probability – Challenge

ANSWER KEY HappyKids.fit

Answers and worked solutions · 8 questions

## A. Think like a mathematician

1. **Yes, independent: the bag is the same for the second choice.**
   Ask: does the first event change the probability of the second?
   Here the bag is the same for the second choice
   So they are independent

2. **No, not independent: revising makes passing more likely.**
   Ask: does the first event change the probability of the second?
   Here revising makes passing more likely
   So they are not independent

3. **Bella's: 172/500 = 0.344, because many more trials give a more reliable estimate**
   Eli: 8/20 from only 20 trials
   Bella: 172/500 = 0.344 from 500 trials
   More trials usually give an estimate closer to the true probability

4. **Hana's: 179/400 = 0.4475, because many more trials give a more reliable estimate**
   Bella: 6/10 from only 10 trials
   Hana: 179/400 = 0.4475 from 400 trials
   More trials usually give an estimate closer to the true probability

5. **After the first is taken there are 10 left and 4 are plain: 5/11 × 4/10 = 2/11.**
   Error: treated the choices as independent
   Second choice: 4 out of 10
   5/11 × 4/10 = 2/11

6. **No. Only (6, 6) works out of 36 outcomes: 1/6 × 1/6 = 1/36.**
   Test it with an example
   Only (6, 6) works out of 36 outcomes: 1/6 × 1/6 = 1/36.
   Decide

7. **5/9. The events are not independent: the first choice changes the second probability.**
   lemon then orange: 4/9 × 5/8; orange then lemon: 5/9 × 4/8; each is 5/18
   Add the two orders (mutually exclusive): 5/9

8. **x = 0.2; P(4) = 0.2**
   The probabilities add up to 1: 0.05 + 0.15 + 4x = 1
   4x = 0.8, so x = 0.2
   P(4) = x = 0.2