

Part 4.1: Probability Trees

1. I have a standard pack of 52 cards.
 - a. If I draw two cards out what is the probability of them both being black?
 - b. If I draw three cards out what is the probability of them all being black?
 - c. If I draw two cards out, how likely is it they are both a face card (King, Queen or Jack)?
2. I have one four sided (numbered 1-4) and one six sided (numbered 1-6) dice. What is the probability when I roll them:
 - a. They are both 1?
 - b. They are both even?
 - c. They are both the same number?
3. I flip 4 coins. Fill in the blanks contingency table below for the number of heads

Number of heads (x)	0	1	2	3	4
P(X=x)	0.0625				
4. Jane and Vikki are playing each other in tennis. The probability that Jane wins the first set is 0.5. If Jane wins a set the probability she wins the next set is 0.6, otherwise it is 0.35. In a women's tennis game you play the best of three sets, so you stop playing once one player has won two sets. What is the probability:
 - a. Jane wins the first two sets?
 - b. The game goes to three sets?
 - c. Jane wins the game?
5. Two students are chosen at random from a class of 12 boys and 13 girls to be office messengers / runners for the school for the day. What is the probability:
 - a. They are both boys?
 - b. They are both girls?
 - c. At least one of the students is a girl?
6. A company manufactures a jellybean game where each colour of jellybean has two possible flavours, one that tastes nice, and the other that is not. In the packet there are 10 green jelly beans, 5 of them are green apple flavoured, and the other 5 are snot flavoured.
 - a. If I eat 3 green jellybeans, what is the probability they are all green apple flavoured?
 - b. If I eat 2 green jellybeans, what is the probability they are all green apple flavoured?
 - c. If I eat 5 green jellybeans, what is the probability I get no snot flavoured jellybeans?
7. In a particular game show, children are given the chance to choose between a valuable prize and one that is quite tempting for the kids, for example a stuffed toy vs a coffee maker, or a family cruise vs a ride on car. They do this while their parents are watching from another room, and the children can't see or hear what the parents are saying. The children get three pairs of prizes to choose from, with the value of the expensive prize increasing each time. The probability the child chooses the expensive prize for each round is 0.35, 0.3 and 0.4 for each round. What is the probability the child chooses:
 - a. No expensive prizes?
 - b. Exactly one expensive prize?
 - c. Two or more expensive prizes?
8. Whenever a particular developer releases an update to their website, the probability of their being a bug is 0.3. What is the probability:
 - a. In three updates there are bugs in all of them?
 - b. In two updates there is a bug in exactly one of them?
 - c. In ten updates there are no bugs?

Part 4.1 Answers

1a. $25/102 = 0.245$ (3sf)

1b. $2/17 = 0.118$ (3sf)

1c. $11/221 = 0.0498$ (3sf)

2a. $1/24 = 0.0417$ (3sf)

2b. $1/4 = 0.25$

2c. $1/6 = 0.167$ (3sf)

3.

Number of heads (x)	0	1	2	3	4
P(X=x)	0.0625	0.25	0.375	0.25	0.0625

4a. 0.3

4b. 0.375

4c. 0.475

7a. 0.273

7b. 0.446

7c. 0.281

5a. $11/50 = 0.22$

5b. $13/50 = 0.26$

5c. $39/50 = 0.78$

8a. 0.027

8b. 0.42

8c. 0.0282 (3sf)

6a. $1/12 = 0.0833$ (3sf)

6b. $2/9 = 0.222$ (3sf)

6c. $1/252 = 0.00397$ (3sf)