

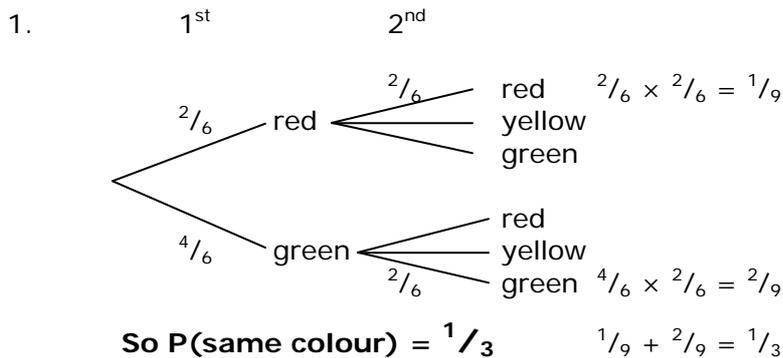
Year 11 Probability Practice #1

- I take two 6-sided dice and mark one with two sides red and four sides green, and the other with two sides red, two sides green and two sides yellow.

If I roll both dice, what is the probability that the sides on top are the same colour?
- A raffle is held at a school to fund a trip. 55 tickets are bought by staff, 70 are bought by students and 125 are bought by friends and family.
 - What is the probability the first prize will be won't be won by a staff member?
 - If the first prize isn't won by a staff member, what is the probability it is won by a student?
- Bill rolls a dice and gets a six twenty-two times out of 100 rolls. He thinks the dice is not fair. Do you think he is right?
- A box of chocolates had 14 with soft centres and 10 crappy ones with nuts in them.
 - If two had been eaten, selected at random, what is the probability that all ten crappy nut ones will still be left?
 - What is the probability that if two are selected at random that they will be one nut and one soft centre?
 - If the first one eaten was a nut centre, what is the probability that the next will be a soft centre, if selected at random?
- There are ten red balls in a bag. How many other coloured balls must be added so that the probability of drawing a red ball at random is 40%?
- If two people are selected at random, what is the probability that they share the same birthday? (You may assume a year has 365 days)

Answers: Year 11 Probability Practice #1

Answers can be fractions, decimals or percentages, but should be at least 3 significant figures



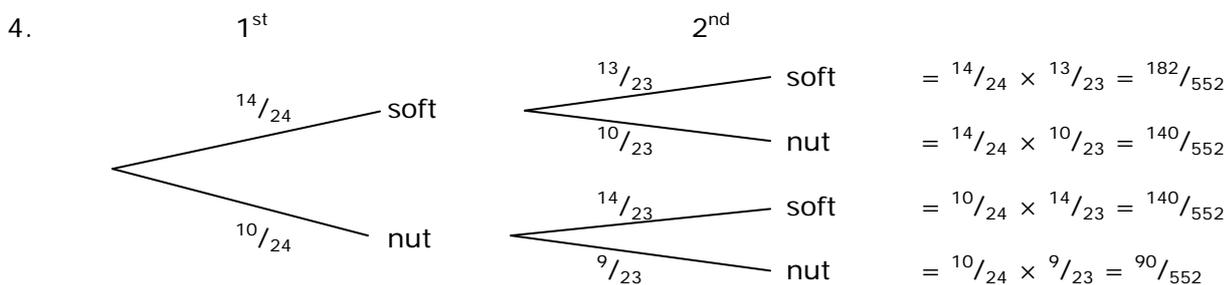
	R	R	G	G	G	G
R	✓	✓				
R	✓	✓				
Y						
Y						
G			✓	✓	✓	✓
G			✓	✓	✓	✓

or $\frac{12}{36} = \frac{1}{3}$

2. a) $\frac{70 + 125}{55 + 70 + 125} = \frac{195}{250} = 0.78 = 78.0\%$

b) Not interested in 55 tickets sold to staff: $\frac{70}{70 + 125} = \frac{70}{195} = 0.359 = 35.9\%$

3. Out of 100 rolls, one would expect $\frac{1}{6} \times 100 = 16.66 = 17$ sixes. However this is only on average, and in practice most times the actual amount would vary, sometimes quite a lot. There isn't enough evidence to suggest this dice is not fair (though it might be).



a) $P(10 \text{ nuts left}) = P(\text{soft then soft}) = \frac{182}{552} = \frac{91}{276} = 0.3297 = 33.0\%$

b) $P(1 \text{ soft and } 1 \text{ nut}) = \frac{140}{552} + \frac{140}{552} = \frac{35}{69} = 0.5072 = 50.7\%$

c) With a nut gone, there are 23 left, of which 14 are soft = $\frac{14}{23} = 0.6087 = 60.9\%$

5. If we call the number of total balls required to be x then $\frac{10}{x} = \frac{40}{100}$ (i.e. 40%)

Solving (using algebra, fraction theory, or even guess and check) we find $x = 25$. But we already have 10 red, so **we need to add 15 extra non-red balls.**

6. The first person will be born on any of 365 days, it does not matter which.

The second person has 1 in 365 chance of sharing that day = $\frac{1}{365} = 0.00274 = 0.27\%$