Basic Probability Practice #3

1. If a bag contains three black and five white marbles: ●●●○○○○○

   a) What is the probability that a random draw will be a black marble?

   b) If two balls are taken out at the same time, and the first is white, what is the probability that the second is white also?

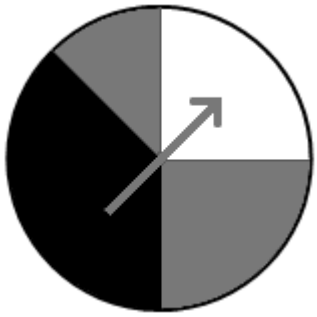
2. Ben has a normal, six sided dice, which he rolls fairly:

   a) How many times would you expect a six to come up, if Ben rolls the dice 12 times?

   b) How many times would you expect a six to come up, if Ben rolls the dice 27 times?

   a) Ben rolls the dice twice and both times a six comes up. What is the probability a six will come up on his next roll?

3. A spinner dial divided into uneven sections is shown:



   a) What is the probability that a spin lands on white?

   b) What is the probability that a spin lands on grey?

   c) What is the probability a spin is on either black or grey?

   d) What is the probability that with two spins **both** are black?

   e) What is the probability that with two spins **neither** is black?

   f) What is the probability that with two spins **at least one** is black?

4. Tim conducts an experiment with a spinner. He makes a tally chart of the results of spins:

Green	Blue	Red	White	Purple	Total
𝍸 IIII	𝍸 𝍸 II	𝍸 𝍸 I	𝍸 𝍸 𝍸 IIII	𝍸 IIII	60

   a) What is the probability he found of getting a White result?

   b) What is the probability he found of getting a Red or Blue result

   c) Are the results what one would expect if the area of the White space on the spinner was twice the size of the area of the Red space? Explain why, or why not.

Answers: Basic Probability Practice #3

1. a) 3 out of 8 **= $^{3}/_{8}$ = 0.375 = 37.5%** (answer can be in any form)

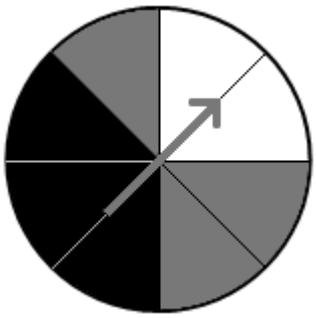
   b) Once a white is taken out, then there are only seven marbles left, only two now of which are white. So the answer is 2 out of 7 **= $^{2}/_{7}$ = 0.2857 = 28.6%**

2. a) $^{1}/_{6} \times 12 = 2$. So would expect **two** sixes.

   b) $^{1}/_{6} \times 27 = 4.5$. But you can't have ½ a six. So would expect **four or five** sixes.

   c) **$^{1}/_{6}$** What happened in previous rolls makes no difference – the dice has no memory.

3. The key is to make the sections all the same size – in this case each $^{1}/_{8}$, and then count the number of equal areas.

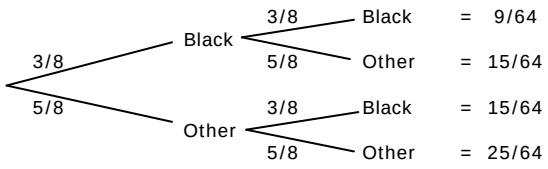


   a) Two equal sections are white, so = **$^{2}/_{8}$ (= $^{1}/_{4}$ = 25%)**

   b) Three (separated) sections are dark grey, so = **$^{3}/_{8}$ (= 37.5%)**

   c) Three black sections and three grey = **$^{6}/_{8}$ (= $^{3}/_{4}$ = 75%)**

   d) Black is $^{3}/_{8}$ of the area . For the probability of an event followed by another event we multiply the two probabilities = $^{3}/_{8} \times {}^{3}/_{8}$ = **$^{9}/_{64}$ (= 0.1406 = 14.1%)**



   e) The opposite of question d), or bottom 3 branches on the tree, = **$^{55}/_{68}$ (= 85.9%)**

   f) The middle two branches on the tree, = **$^{30}/_{68}$ (= 44.1%)**
   Or either Black – Not black or Not black – Black = $^{3}/_{8} \times {}^{5}/_{8} + {}^{5}/_{8} \times {}^{3}/_{8}$ = **$^{30}/_{64}$**

4. a) 19 days out of the 60 = **$^{19}/_{60}$** (or = **0.31666** = **31.7%**)

   b) 12 + 11 days out of the 60 = **$^{23}/_{60}$** (or = **0.3833** = **38.3%**)

   c) The results are what one might expect if White is twice the size of Red. On average the number of Whites would be twice the number of Reds if this were true, but there is always experimental variation, so it would rarely be perfect. 19 is close enough to twice 11. (Note it is also possible that White **isn't** twice Red, we just can't tell yet.)