

Basic Probability Practice #4

1. A bag contains black, grey and white marbles, as shown: ●○○●○○○○●●
- a) What is the probability that a random draw will be a black marble?
 - b) What is the probability that a random draw will not be a grey marble?
 - c) What is the probability that a random draw will be a grey or black marble?
 - d) What is the probability that if two random draws are made (putting the marbles back between draws) that both draws will be grey marbles?

2. The statistics about some of the Social Science options taken at a school at Year 11.

	History	Geography	Economics	Total Students
Boys	22	25	28	110
Girls	19	30	15	105

- a) What is the probability that a randomly selected student does Geography?
 - b) What is the probability that an Economics student is a boy?
 - c) Why can we not calculate from the information given the probability a boy does at least one of History or Geography?
3. A restaurant offers a fixed menu, with two choices of starter (Soup or Mussels) and four choices of main course (Fish, Chicken, Beef or Vegetarian) and three choices of dessert (Sorbet, Gateau or Cake)
- a) How many different variations of meal are possible if you take one starter, one main and one dessert?
 - b) What is the probability that a random meal with one of each choice will have Mussels but not Sorbet?
 - c) What is the probability that choosing a meal randomly will give at least one of Fish and Soup?

Answers: Basic Probability Practice #4

1. a) 4 out of 12 = $\frac{4}{12} = \frac{1}{3} = 0.333 = 33.3\%$ (answer can be in any form)
- b) 10 are not grey out of 12 = $\frac{10}{12} = \frac{5}{6} = 0.833 = 83.3\%$
- c) 2 + 4 = 6 out of 12 = $\frac{6}{12} = \frac{1}{2} = 0.5 = 50\%$
- d) For one draw probability of grey = 2 out of 12 = $\frac{2}{12} = \frac{1}{6}$
 For one event then another we multiply: two grey in a row = $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36} = 0.02777$

2. a) 55 out of the 215 students = $\frac{55}{215}$ (or = $\frac{11}{43} = 0.256 = 25.6\%$)
- b) 28 out of the 43 economics students = $\frac{28}{43}$ (or = $0.464 = 46.4\%$)
- c) Because out of the 110 boys some might do both, and we are not told how many.
 Probability is no more than $\frac{22 + 25}{110}$ but will be less, depending on how many do both.

3. a) $2 \times 4 \times 3 = 24$ variations (listed here, or use tree below to see the same thing)
- | | | | | | |
|-------|--------------|--------------|-------|-------|-------|
| M-F-S | M-F-G | M-F-C | S-F-S | S-F-G | S-F-C |
| M-C-S | M-C-G | M-C-C | S-C-S | S-C-G | S-C-C |
| M-B-S | M-B-G | M-B-C | S-B-S | S-B-G | S-B-C |
| M-V-S | M-V-G | M-V-C | S-V-S | S-V-G | S-V-C |
- b) 8 of the 24 options are mussels but not sorbet = $\frac{8}{24}$ (or = $\frac{1}{3} = 0.333 = 33.3\%$)
 (these 8 options are ticked on the tree below, and bolded on the list above)
- c) 15 of the 24 options list fish and/or soup = $\frac{15}{24}$ (or = $\frac{5}{8} = 0.625 = 62.5\%$)

