Probability - unit test

date: . . . . , class: . . . . , student: . . . .

- **Exercise 1:** Consider all the possible passwords formed by 5 distinct letters of the English alphabet (which is formed by 26 letters):

  - how many of these passwords don't start with "S"?
  - how many of these password start with "WY"?
  - in how many ways can you choose 5 distinct letters to form the password?

- **Exercise 2:**[1] Throw two dice. What is the probability the two scores are different?

- **Exercise 3:**A bag contains 3 red marbles and 8 blue marbles. Consider the two events A = "the first extracted marble is red" and B = "the second extracted marble is blue". Are events A and B independent? Motivate your answer.

- **Exercise 4:**[2] The probability that Alex arrives home on time is 0.7. If he does arrive home on time, the probability that his dinner is burnt is 0.1. If he does not arrive home on time, the probability that his dinner is burnt is 0.8. What is the probability that Alex arrives home on time and his dinner is not burnt?

- **Exercise 5:**[3] A company has 3 factories (A,B, and C).

  - factory A fabricates half of the products, and 10% of these are defective;
  - factory B fabricates one third of the products, and 7% of these are defective;
  - factory C fabricates all the remaining products, and 5% of these are defective.

  Given that a product is defective, what is the probability that it comes from factory A?

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[1]this exercise is taken from
https://www.mathsisfun.com/data/probability-complement.html
[2]this exercise is taken from
http://www.bbc.co.uk/schools/gcsebitesize/maths/statistics/
probabilityhirev3.shtml
[3]this exercise is a translation of question number 8 of the Italian secondary school exit exam from 2012.