

## Section 4: The product rule for counting

### Exercise

1. How many strings of three upper case letters are there if repeated letters are allowed?
2. A clothes shop is putting together suit and tie sets. There are 8 different colours of shirt and 6 different colours of tie. How many distinct sets are there?
3. A pancake is being made with two fruit ingredients and a choice of either sugar or maple syrup topping. One fruit must be chosen from the first column in the below and the other fruit from the second column. How many different pancakes can be made? Draw a tree diagram to represent this and list the different pancakes.

Apples Pears Bananas	Strawberries Raspberries
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4. Car number plates in a country have the form

NNN LLL

where the character in the position marked N is a digit from 0 – 9 and the character in the position marked LLL is an upper-case letter from A – Z. How many number plates are there if

- (a) Repeated digits and letters are allowed?
  - (b) No repeated digits or repeated letters are allowed?
  - (c) The first digit cannot be zero but repeated digits and letters are allowed?
5. A bag holds 6 balls in 6 different colours: red, blue, yellow, orange, green and purple. I remove three balls. What is the probability that the three balls that I remove are coloured red, blue and yellow
    - a) In this order?
    - b) In any order?
  6. Alice, Bob, Charlie, Dave and Erin are sat on bench in this order. In how many other **different** arrangements could they be sat on the bench?
  7. A test is to be made up of 7 questions selected from a question bank containing 10 possible questions. How many different tests can be made using these 10 questions?  
Note: two tests containing the same 7 questions but in a different order are considered different tests and no question can be repeated in the same test.