

Math 55 Quiz 6 DIS 106

Name: _____

14 Mar 2022

1. A Californian license plate is made using one digit followed by three upper case English letters followed by another three digits, for example: 5FVP402 is a valid license plate.

- (a) How many license plates whose letters are distinct and appear in alphabetical order can be made? [3 points]
- (b) How many license plates whose digits multiply up to 15 can be made? [3 points]
- (c) How many license plates that contain the digits 3, 1, 4 in that order can be made? [4 points]

(a) This is equivalent to choosing 3 distinct letters out of the 26 possible letters (and then choosing 4 digits). Hence there are $\binom{26}{3} \cdot 10^4 = 26000000$ possible license plates.

(b) The digits must be 1, 1, 3, 5. So there are $4 \cdot 3 = 12$ ways to arrange these digits (or $\frac{4!}{2!1!1!} = 12$). Together with the letters, there are $12 \cdot 26^3 = 210912$ possible license plates.

(c) Suppose the digits are 3, 1, 4, n.

If $n = 1, 3, 4$, there are 3 ways of arranging the digits, e.g. when $n = 1$, we have 1, 3, 1, 4; 3, 1, 1, 4; 3, 1, 4, 1.

If $n \neq 1, 3, 4$, there are 4 ways of arranging the digits, e.g. when $n = 0$, we have 0, 3, 1, 4; 3, 0, 1, 4; 3, 1, 0, 4; 3, 1, 4, 0.

So there are $3 \cdot 3 + 7 \cdot 4 = 37$ combinations for the digits. Together with the letters, there are $37 \cdot 26^3 = 650312$ possible license plates.