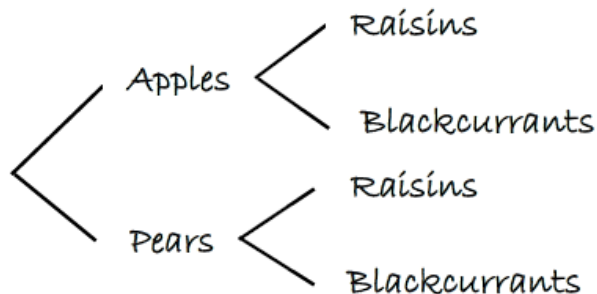


The Product Rule for Counting Section Test

(Answers)

1. The tree diagram looks like this:



We can see from the tree diagram that the different combinations are:

- Apple and Raisin
- Apple and Blackcurrant
- Pear and Raisin
- Pear and Blackcurrant

So, four different crumbles can be made.

2. There are three ways to choose the first digit, three ways to choose the second digit and three ways to choose the third digit since digits can be repeated. So, the number of three- digit numbers that can be made is:

$$3 \times 3 \times 3 = 3^3 = 27$$

3. The two-digit numbers go from 10 to 99 so there are 90 two-digit numbers. Of these numbers, 10, 20, 30, 40, 50, 60, 70, 80 and 90 all contain a 0. So the number of two-digit numbers that don't have 0 as a digit is:

$$90 - 9 = 81$$

4. Using 5 different characters results in $5 \times 5 \times 5 \times 5 = 5^4 = 625$ different four-character codes that can be made because for each character of the code there is a choice of 5 different characters that could be used.

5. There are four ways to choose the bread, eight ways to choose the fillings and 7 ways to choose the sauce (there is the option for one of the six sauces OR no sauce). So, the number of different sandwich choices are:

$$4 \times 8 \times 7 = 224$$

6. There is a choice of 10 digits for the first character, 10 digits for the second character, 26 characters for the third character and 26 characters for the fourth character. So, the number of four-character codes that can be made is
 $10 \times 10 \times 26 \times 26 = 10^2 \times 26^2 = 67,600$

7. There is 150 ways to choose the year 11 student, 30 ways to choose the year 12 student and 22 ways to choose the year 13 student so the number of selections for the three students is:
 $150 \times 30 \times 22 = 99,000$

8. There are 5 choices for the character classes, 4 choices for the clans, then 6 choices for special powers so the number of possible avatars is $5 \times 4 \times 6 = 120$.

9. 10 questions can be arranged in $10!$ different ways.
 $10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 3,628,800$

10. There are 10 ways to choose the sandwich, 4 ways to choose the drink and y ways to choose a packet of crisps. So, the number of possible combinations is:
 $10 \times 4 \times y = 240$
 $40y = 240$
 $y = 6$
So, there is 6 ways to choose a packet of crisps meaning there must be 6 different types of packets of crisps.