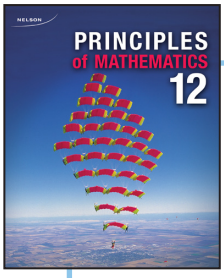


- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 86, *Your Turn*

Flowchart Questions	Response	Explanation
Does order matter?	Yes	When a song is used in the playlist it cannot be used again.
Are you using all the objects in the group?	No	Only six of ten songs will be on the playlist.
Are some of the objects identical?	No	The songs are unique.
Are there conditions?	No	No conditions are specified in the question.

Seven-song playlists:

$$_{10}P_7 = \frac{10!}{(10-7)!} = \frac{10!}{3!} = 604\ 800$$

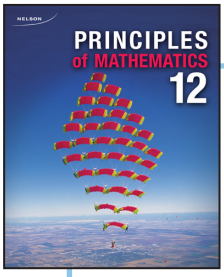
Eight-song playlists:

$$_{10}P_8 = \frac{10!}{(10-8)!} = \frac{10!}{2!} = 1\ 814\ 400$$

Nine-song playlists:

$$_{10}P_9 = \frac{10!}{(10-9)!} = \frac{10!}{1!} = 3\ 628\ 800$$

As r gets closer to n, the value of $_nP_r$ becomes larger. As we increase the number of objects we use in each arrangement, the number of permutations that can be made using these objects increases.



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 100, *Your Turn*

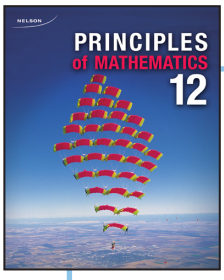
The assumption being made is that each of the white, red, and green flags is identical.

Flowchart Questions	Response	Explanation
Does order matter?	Yes	Each arrangement of the flags has a specific meaning.
Are you using all the objects in the group?	Yes	All nine flags are hung up.
Are some of the objects identical?	Yes	There are 3 white, 3 red, and 3 green flags.
Are there conditions?	No	No conditions are specified in the question.

Prediction – There would be fewer than 15 120 arrangements of the flags.

$P = \dfrac{9!}{3! \cdot 3! \cdot 3!} = 1680$ The prediction is verified.

In Dorji's solution 9! is being divided by 2!·3!·2!, to eliminate the identical arrangements. In this question, you would have to divide by the larger value 3!·3!·3! because the number of identical objects has increased. Dividing by a large number results in a smaller quotient, so you would expect this solution to be smaller than Dorji's solution.



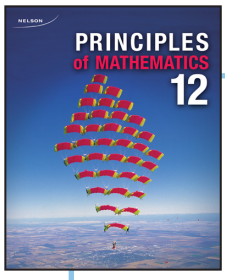
- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 103, *Your Turn*

Flowchart Questions	**Response**	**Explanation**
Does order matter?	Yes	When you walk down a particular street you cannot walk it again.
Are you using all the objects in the group?	Yes	All seven blocks going south and east between the school and Carrie's house are used.
Are some of the objects identical?	Yes	There are three east blocks and four south blocks.
Are there conditions?	No	No conditions are specified in the question.

I predict Carrie will have fewer than 56 possible routes because the number of blocks between her home and the school is fewer than the number on Jean's route. ✓

$P = \frac{7!}{3! \cdot 4!} = 35$ The prediction is verified. ✓



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 101, *Your Turn*

a.

Flowchart Questions	Response	Explanation
Does order matter?	Yes	When a letter is used once in the arrangement, it cannot be used again.
Are you using all the objects in the group?	Yes	All six letters are being arranged.
Are some of the objects identical?	Yes	The letter A appears three times.
Are there conditions?	No	No conditions are specified in the question.

There are six tasks (represented by 6!), but the letter *A* appears three times. Eliminate this identical arrangement by dividing by 3!.

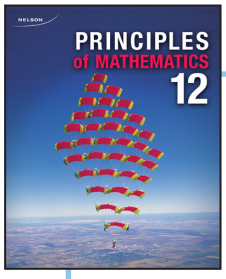
$P = \frac{6!}{3!} = 120$ There are 120 arrangements of the letters.

b.

Flowchart Questions	Response	Explanation
Does order matter?	Yes	When a letter is used once in the arrangement, it cannot be used again.
Are you using all the objects in the group?	Yes	All six letters are being arranged.
Are some of the objects identical?	Yes	The letter A appears three times.
Are there conditions?	No	AND condition: The placement of the letter C is specified.

The first task is filled by the letter C. Because there is only one C, there is only one way to make this arrangement. There are five remaining tasks (represented by 5!) and the *A* appears three times, so eliminate this identical arrangement by dividing by 3!.

$1 \cdot \frac{5!}{3!} = 20$ There are 20 arrangements of the letters.



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 90, *Your Turn*

Flowchart Questions	Response	Explanation
Does order matter?	Yes	Each car can be put in only one location.
Are you using all the objects in the group?	Yes	All seven cars are being arranged.
Are some of the objects identical?	No	Each car is distinct.
Are there conditions?	Yes	AND conditions: Two groups of cars, the reds and all the others, are specified.

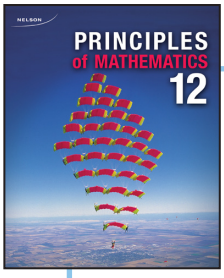
There are seven cars but because the reds are grouped you treat them as one task. Also, the other four cars are grouped so you treat them as one task. As a result, this problem has only two tasks. The arrangement of two distinct tasks is ${}_2P_2$.

You must now consider the two groups and how the cars can be arranged in each. The red cars are a group of three distinct objects that can be shown ${}_3P_3$. The group of the other four cars is shown ${}_4P_4$.

Multiply to find the total arrangements of the seven cars.

$$\begin{aligned} &{}_2P_2 \times {}_3P_3 \times {}_4P_4 \\ &= 2! \times 3! \times 4! \\ &= 288 \end{aligned}$$

The cars can be parked in 288 ways.



- If you have any difficulty with these solutions, please contact your teacher before continuing.

Page 88, *Your Turn*

Flowchart Questions	Response	Explanation
Does order matter?	Yes	A password would be different if the arrangement of characters in it changed.
Are you using all the objects in the group?	No	Only eight of the sixty-two possible characters are used.
Are some of the objects identical?	No	Each available character for the password is unique.
Are there conditions?	No	No conditions are specified in this question.

To calculate the number of arrangements for an eight digit password use ${}_nP_r$ where $n = 62$ and $r = 8$.

${}_{62}P_8 = 136\ 325\ 893\ 334\ 400$

The magazine website is more secure because more passwords are possible. This makes determining legitimate passwords more difficult for hackers.