

5.3 Probabilities Using Counting Methods p. 313

Name _____

Date _____

Goal: Solve probability problems that involve counting techniques.**Example 1:** Solving a probability problem using counting techniques (p. 314)

Jamaal, Ethan, and Alberto are competing with seven other boys to be on their school's cross-country team. All the boys have an equal chance of winning the trial race. Determine the probability that Jamaal, Ethan, and Alberto will place in the top three, in any order.

Does order matter?

Solution: There are _____ ways in which three runners can place in three positions.

There are _____ favourable outcomes.

There are _____ ways that 10 runners can place in first, second, or third.

There are _____ possible outcomes.

$P(\text{Jamaal, Ethan and Alberto place top 3}) =$

Example 2: Solving a probability problem with the Fundamental Counting Principle (p. 316)

Channing has three children. Determine the probability Channing has at least one boy.

Example 3: Solving a probability problem using reasoning (p.318)

Beau hosts a morning radio show in Saskatoon. To advertise his show, he is holding a contest at a local mall. He spells out SASKATCHEWAN with letter tiles. Then he turns the tiles face down and mixes them up. He asks Sally to arrange the tiles in a row and turn them face up. If the row of tiles spells SASKATCHEWAN, Sally will win a new car. Determine the probability that Sally will win the car.

There are _____ letters in total: _____ S's, _____ A's, and _____ other letters.



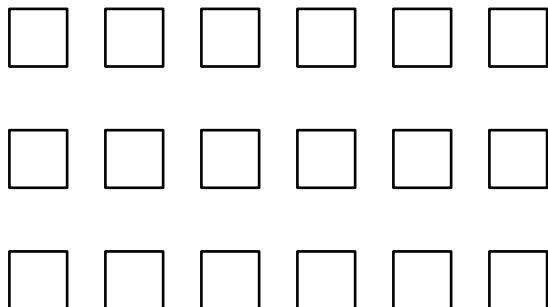
The total number of ways to arrange the letters, $L =$

The total number of ways to spell SASKATCHEWAN, $R =$

$P(\text{winning the car}) =$

Example 4: Solving a probability problem with conditions (p. 319)

There are 18 bikes in Marnie's spinning class. The bikes are arranged in 3 rows, with 6 bikes in each row. Allison, Brett, Carol, Doug, Erica, and Franco each call the gym to reserve a bike. They hope to be in the same row, but they cannot request a specific bike. Determine the probability that all friends will be in the same row, with Allison and Franco at either end, F.



- Number of ways to seat Allison and Franco at either end:

- Number of ways to seat the other 4 friends:

- Number of ways to seat the other 12 people in the class:

- Total number of ways to assign 18 people to 18 bikes:

$P(F) =$