

Probability Rules (No Replacement)

The “AND” and “OR” Rule

The probability that A and B both occur	$P(A \text{ and } B) = P(A) \times P(B)$
The probability that either A or B occur	$P(A \text{ or } B) = P(A) + P(B)$

What Does ‘No Replacement’ Mean?

In probability without replacement, the sample size decreases every time an object is drawn. This means that probability events are dependent on one another.

EXAMPLE: There are 2 blue marbles and 5 red marbles. A blue marble is picked with a chance of $\frac{2}{7}$. However, this **decreases** the total number of marbles to 6 instead of 7 with only 1 blue marble remaining. The chance of drawing the last blue marble is now $\frac{1}{6}$.

Instructions: Answer the probability questions below.

In your closet, there are three blue shirts, two black shirts, four white shirts, one pink shirt and two red shirts. Every time a shirt is worn, it becomes dirty and cannot be worn until the end of the week.

1

What is the probability of choosing a white, red or blue shirt?

2

What is the probability of choosing a black shirt on Monday and then a pink shirt on Tuesday?



A jar of sweets contains twelve purple sweets, eighteen green sweets and ten blue sweets.

1

What is the probability of picking a green sweet or a blue sweet on the first pick?

2

What is the probability that your first pick is a blue sweet and your second pick is a purple sweet?

3

What is the probability that your first pick is a green sweet, your second pick is a blue sweet and your third pick is a green sweet?

A box of counters contains 20 red counters, 16 blue counters, 17 clear counters and 23 green counters.

1

What is the probability of choosing a clear or green counter on the first pick?

2

What is the probability that your first pick is a blue counter and your second pick is a red counter?

3

What is the probability that your order of picks is blue, red, blue and then red?



There are 12 orange blocks, 16 white blocks in a pile and 8 red blocks.
Two blocks are removed one after another.
Use a tree diagram to solve this problem.

1

What is the probability that an orange block is chosen on the second removal if the first block is not orange?

2

What is the probability that an orange or white block is chosen on the second removal if the first block is white?

3

What is the probability that the two counters chosen will be the same colour?



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Instructions: Answer the probability questions below.

A large platter of pizza has twenty-four pepperoni slices, thirty cheese slices, twelve vegetarian and fourteen chicken slices.

1

What is the probability of selecting a chicken or pepperoni slice?

2

What is the probability of eating a cheese slice and then a vegetarian slice?



A box of cookies has three flavours. There are thirty chocolate chip cookies, eighteen dark chocolate and twelve white chocolate cookies.

1

What is the probability that your first cookie is not chocolate chip?

2

What is the probability that you eat two dark chocolate cookies in a row?

3

What is the probability that you eat three cookies in the order of white chocolate, chocolate chip and chocolate chip?

At a baking factory, there are 22 cake workers, 48 cookie workers, 30 packing workers and 10 cleaners. Workers all have an equal chance of being selected as Employee of the Month (EOTM). However, workers cannot be re-selected if they were chosen in the previous month.

An entire month must pass before they can be selected again.

1

What is the probability that a worker making cakes or cookies is selected for April's EOTM?

2

What is the probability that a worker who packs goods is EOTM in both June and July?

3

What is the probability that the EOTM in August, September and October is a cake worker, a cleaner and another cleaner, respectively?



In a bag, there are 20 grape lollipops, 14 orange lollipops and 26 lemon lollipops. Two lollipops are selected.
Use a tree diagram to solve this problem.

1

What is the probability that a lemon lollipop is chosen second if the first selection was not a grape lollipop?

2

What is the probability that only one lollipop is chosen?

3

If instead three lollipops are selected, what is the probability that they will all be lemon flavoured?