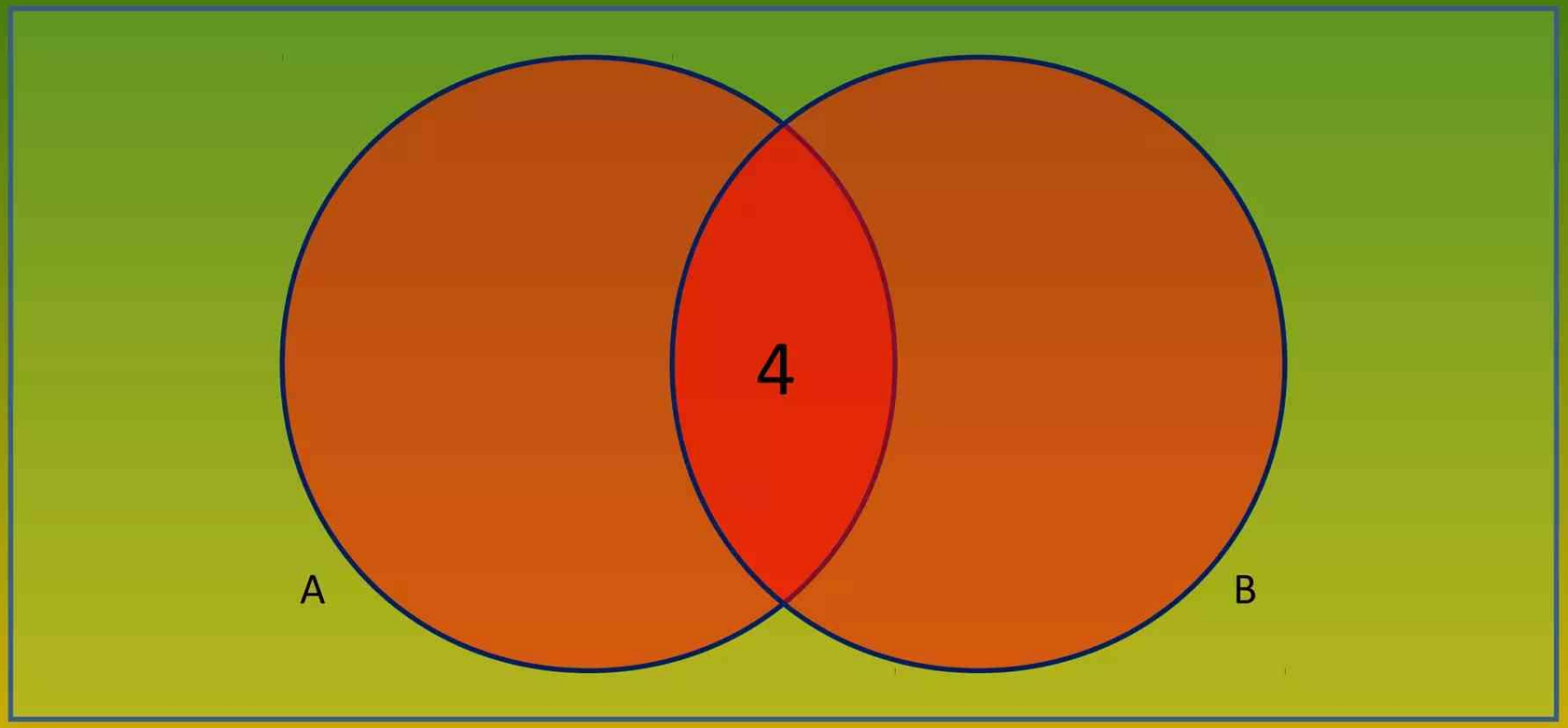
Venn Diagrams

Using the numbers 0, 1, 2, … , 9 illustrate the sets: $A=\{4, 7, 9\}$ and $B=\{1, 2, 3, 4, 5\}$

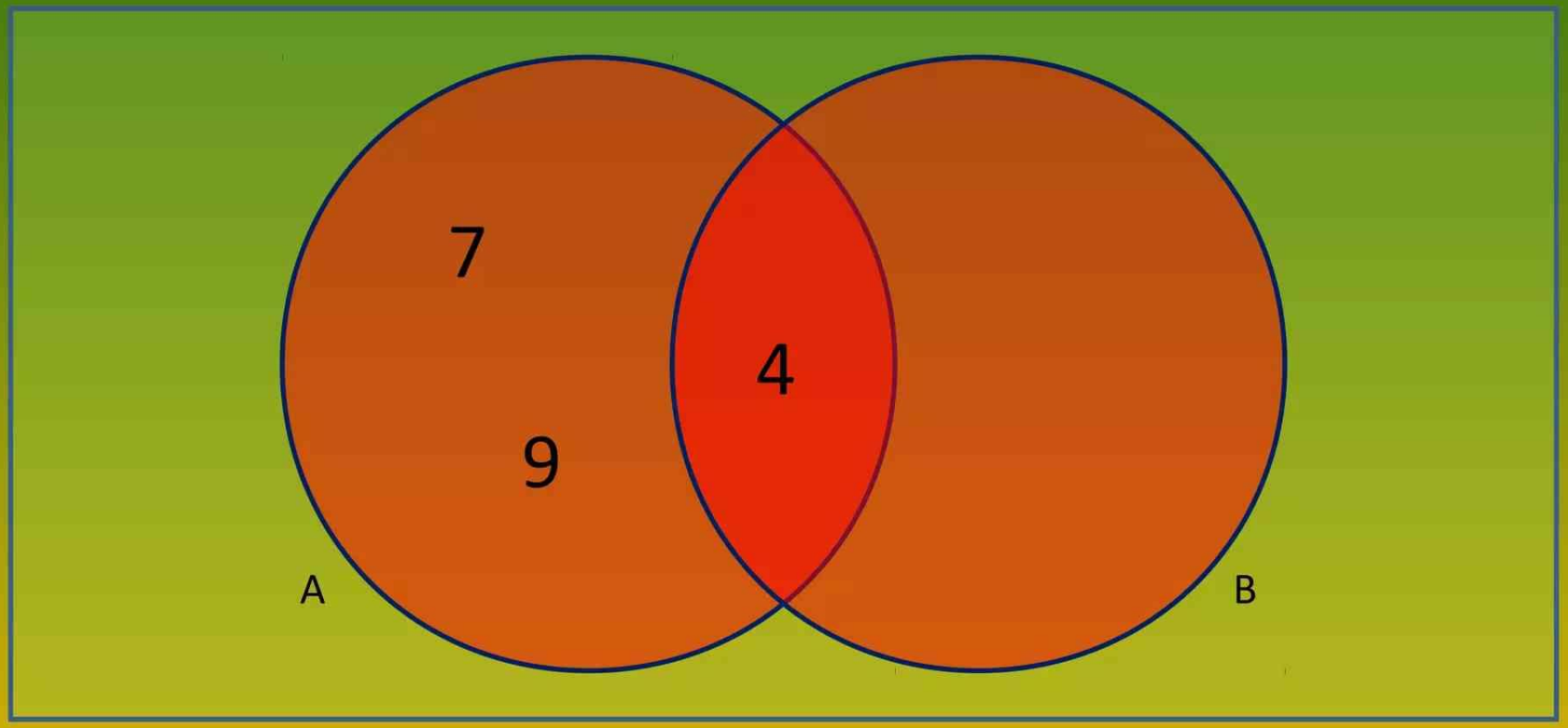
Solution: Use a Venn diagram

Using the numbers 0, 1, 2, … , 9 illustrate the sets: $A=\{4, 7, 9\}$ and $B=\{1, 2, 3, 4, 5\}$



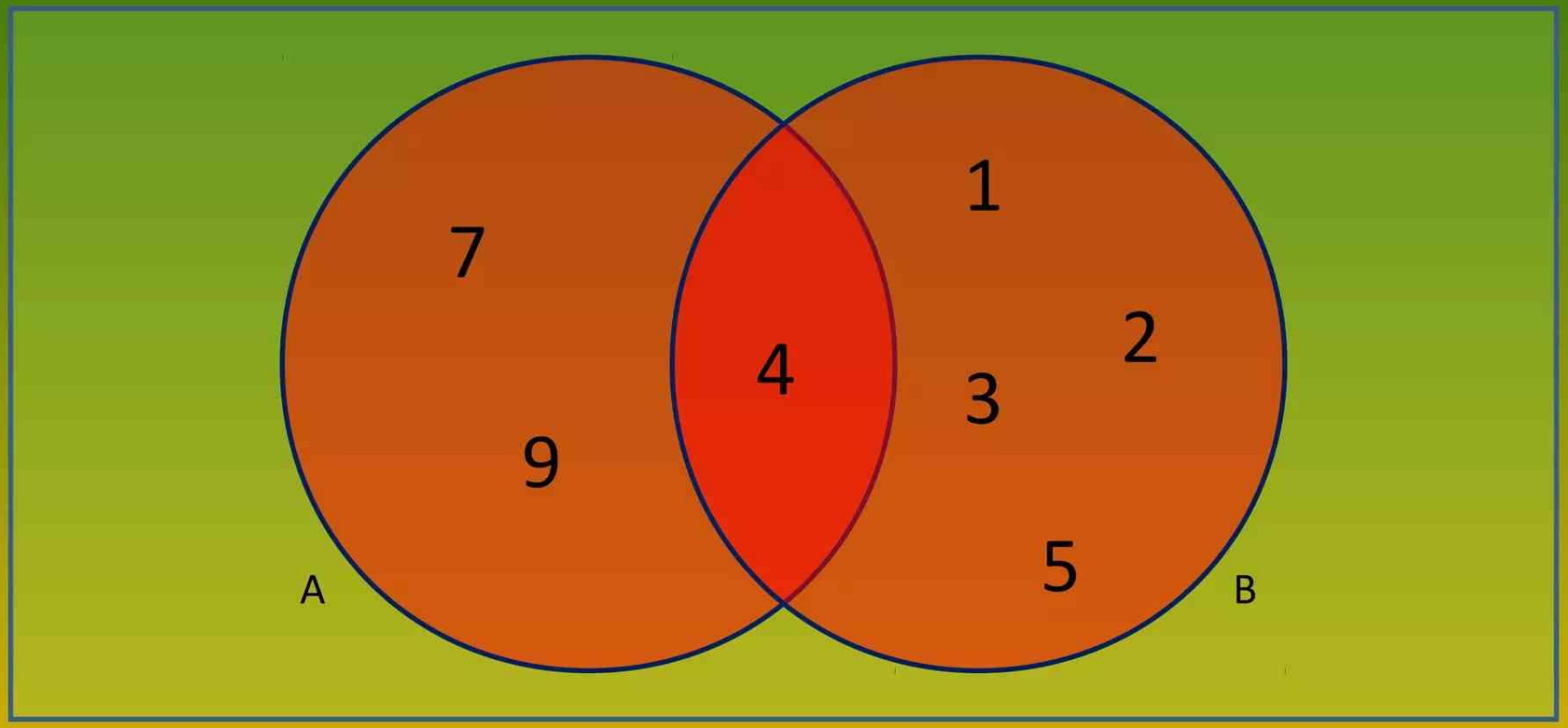
4 is in BOTH sides

Using the numbers 0, 1, 2, … , 9 illustrate the sets: $A=\{4, 7, 9\}$ and $B=\{1, 2, 3, 4, 5\}$



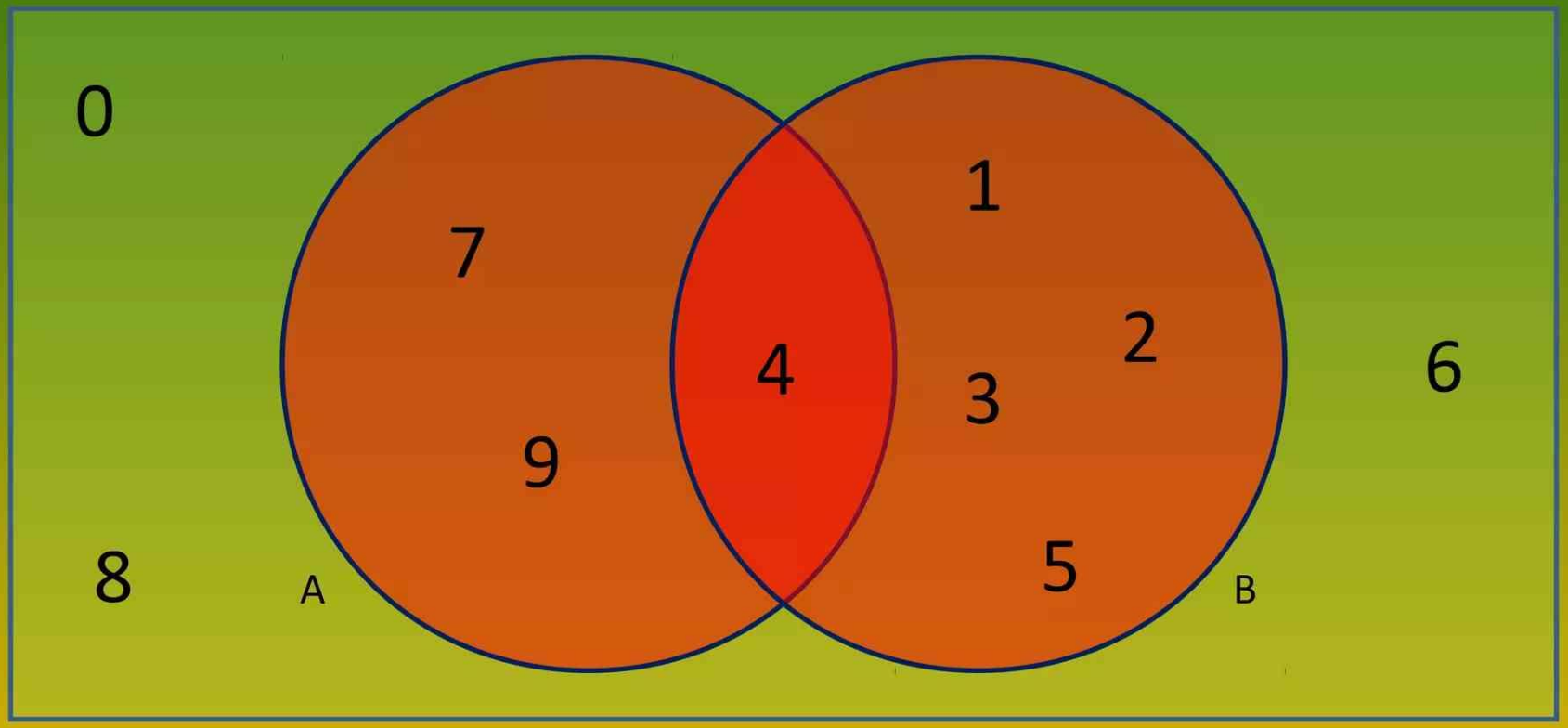
7 and 9 are only in set A

Using the numbers 0, 1, 2, … , 9 illustrate the sets: $A=\{4, 7, 9\}$ and $B=\{1, 2, 3, 4, 5\}$



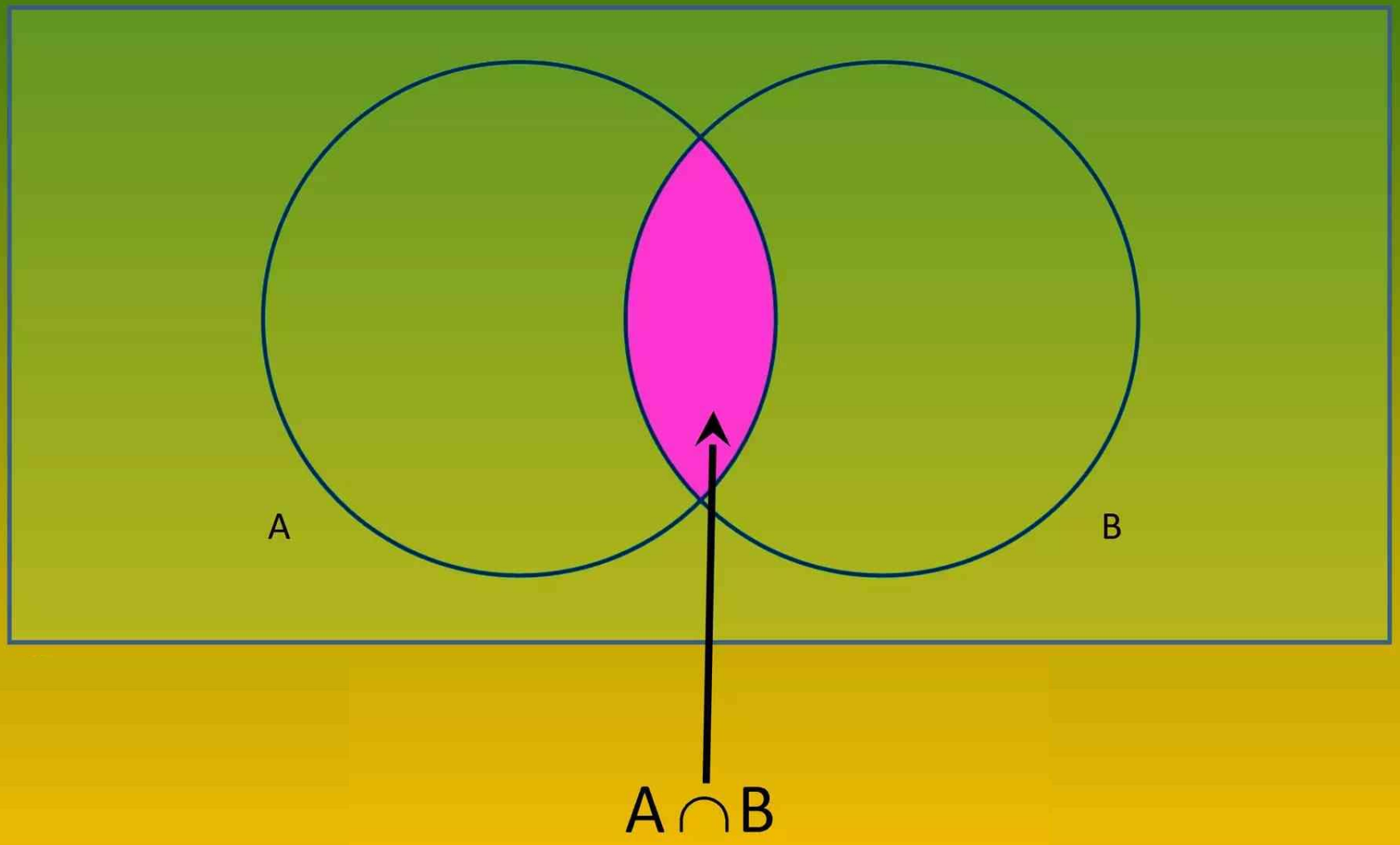
2, 3 and 5 are only in set

Using the numbers 0, 1, 2, … , 9 illustrate the sets: $A=\{4, 7, 9\}$ and $B=\{1, 2, 3, 4, 5\}$

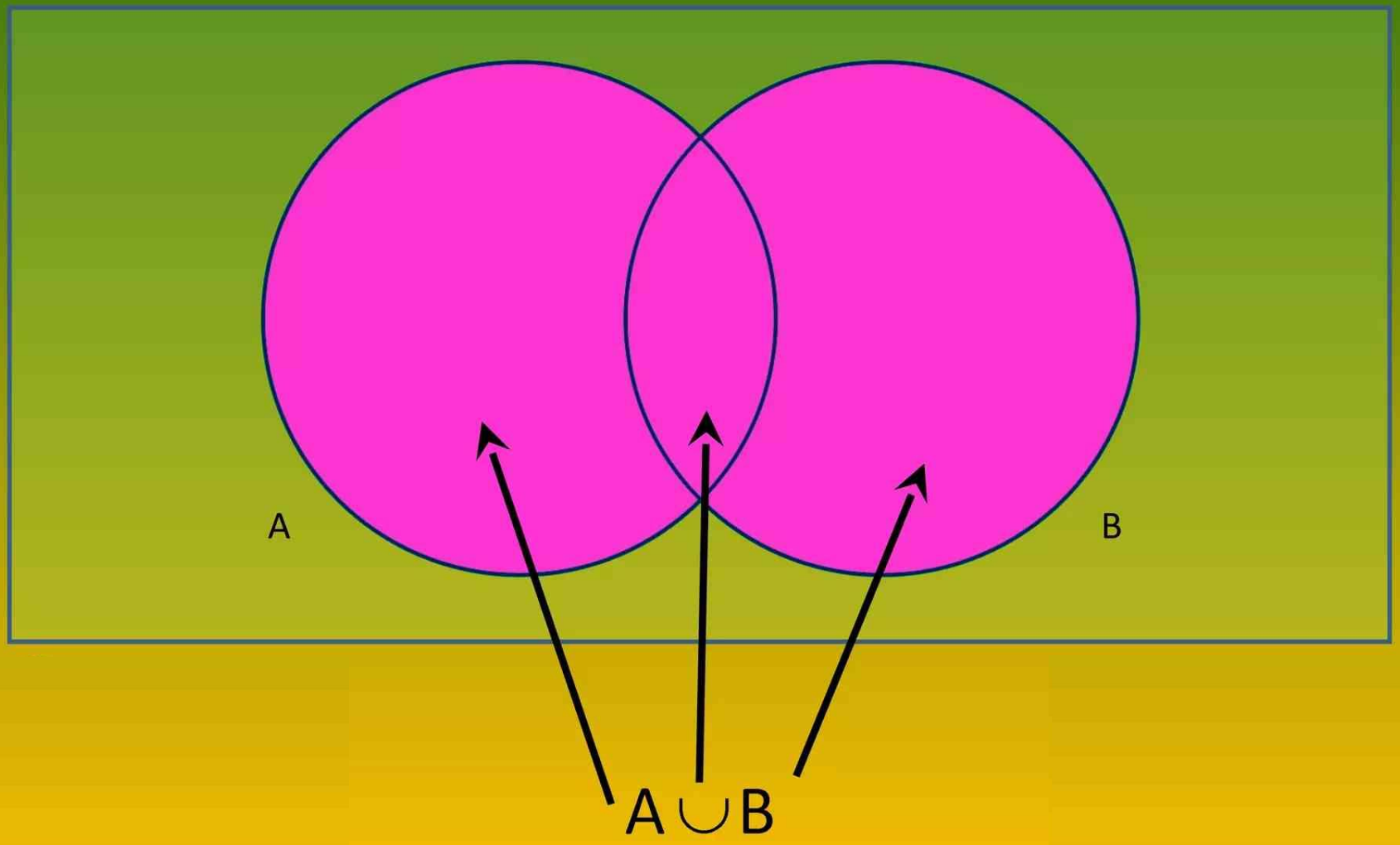


, 6 and 8 are not in A or

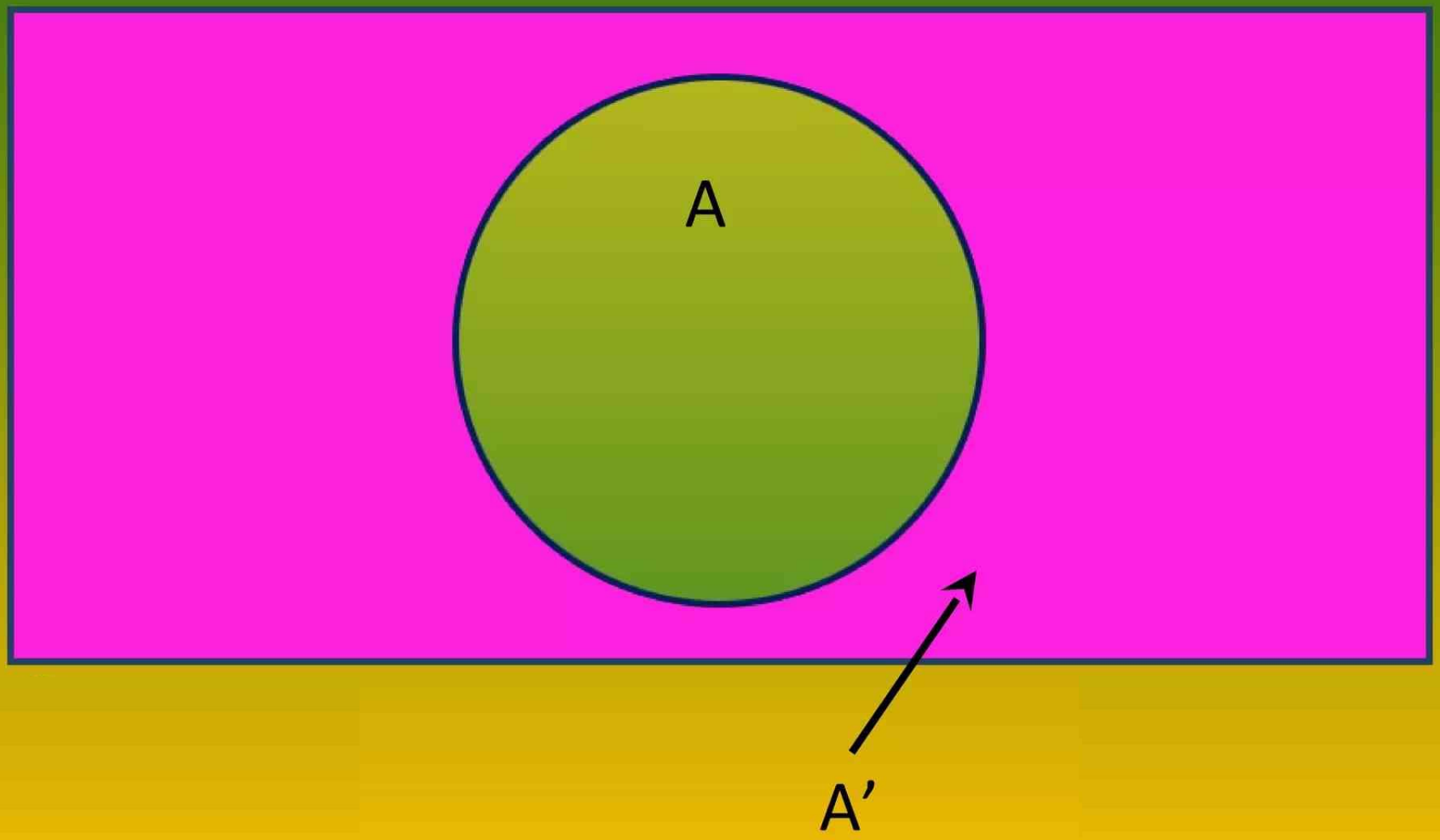
Intersection: Members of both set A and set B



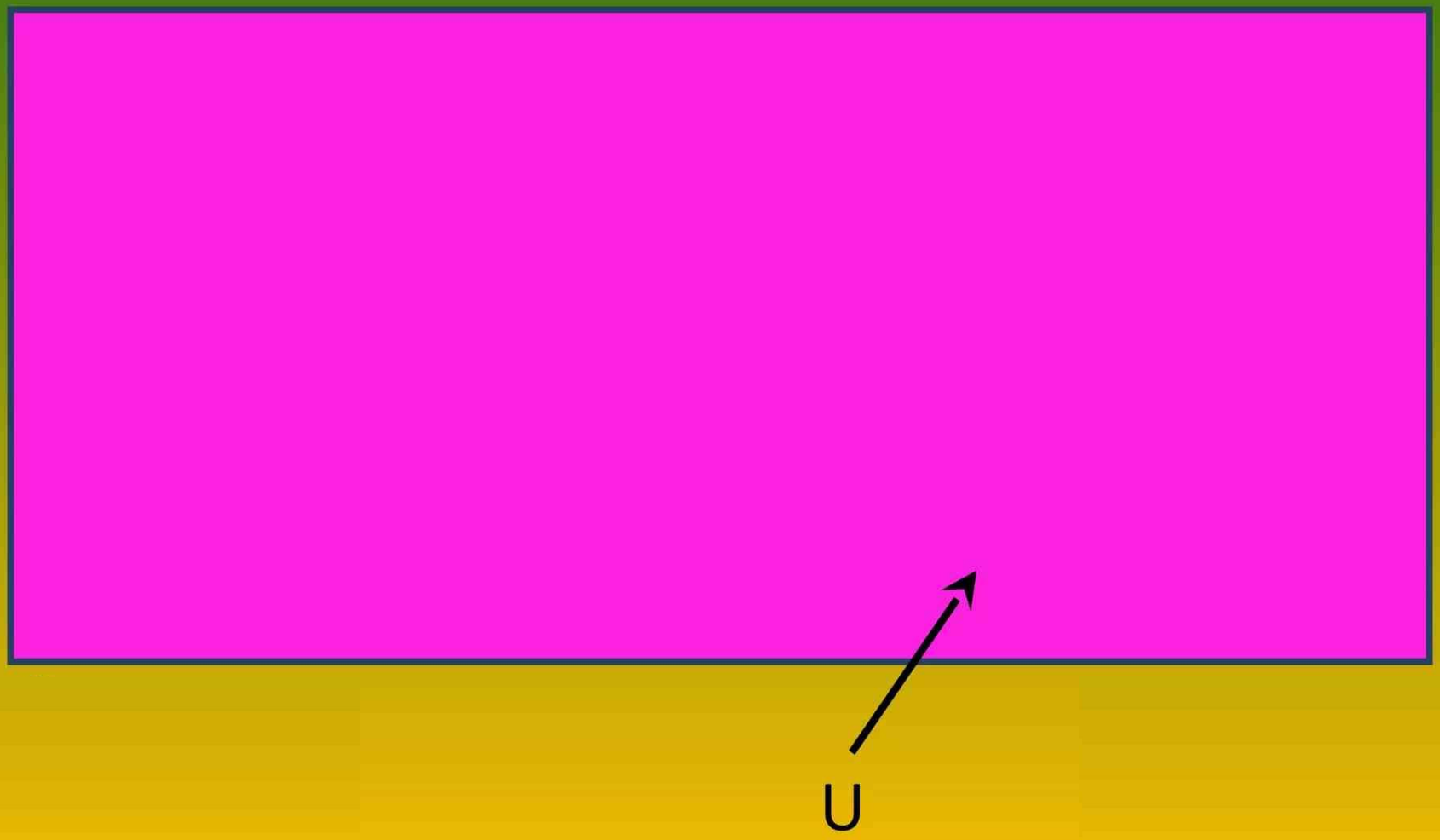
Union: Members of set A or set B or both



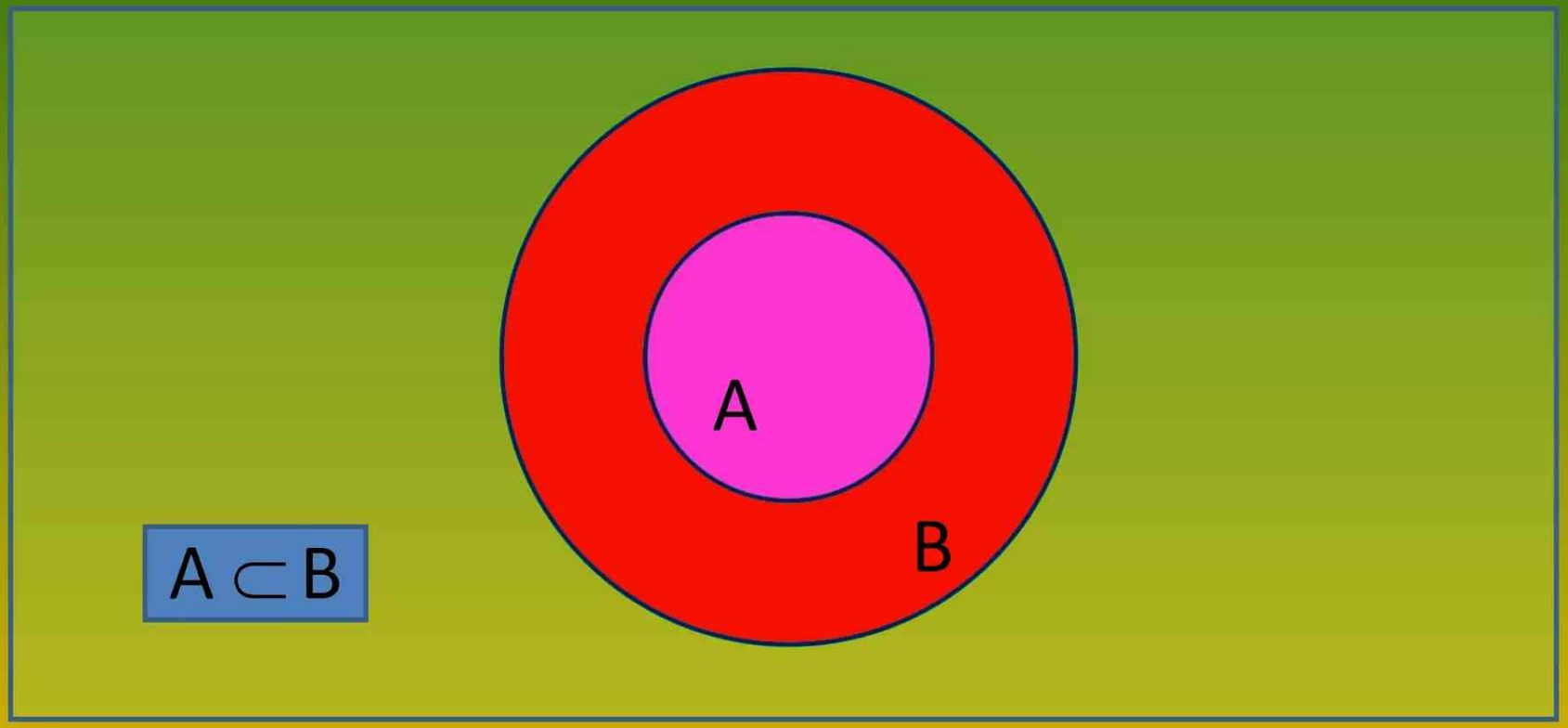
Complementary: Members not in the set



Universal Set: All members



Subset: All members of set A are in set B

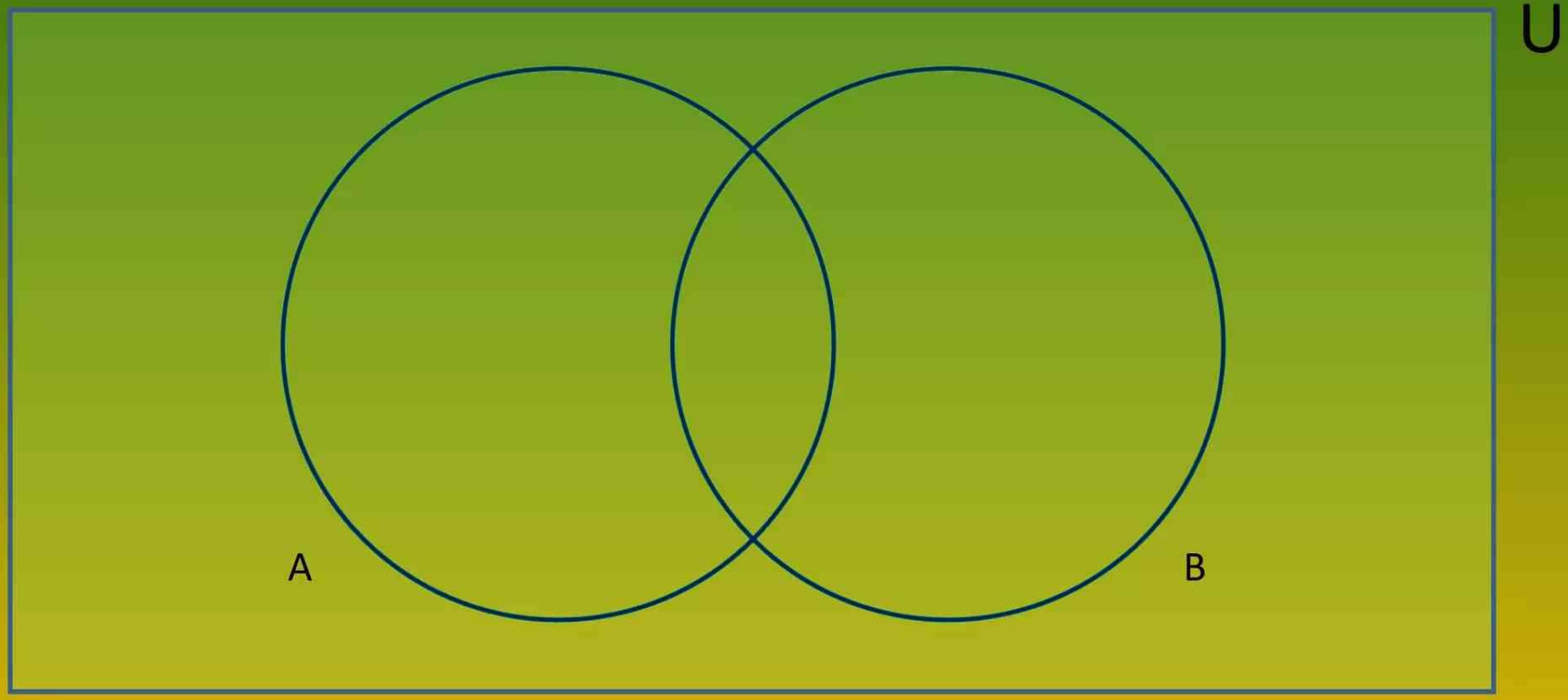


Number of elements in a set: $n(A)$

Empty set: $\emptyset$

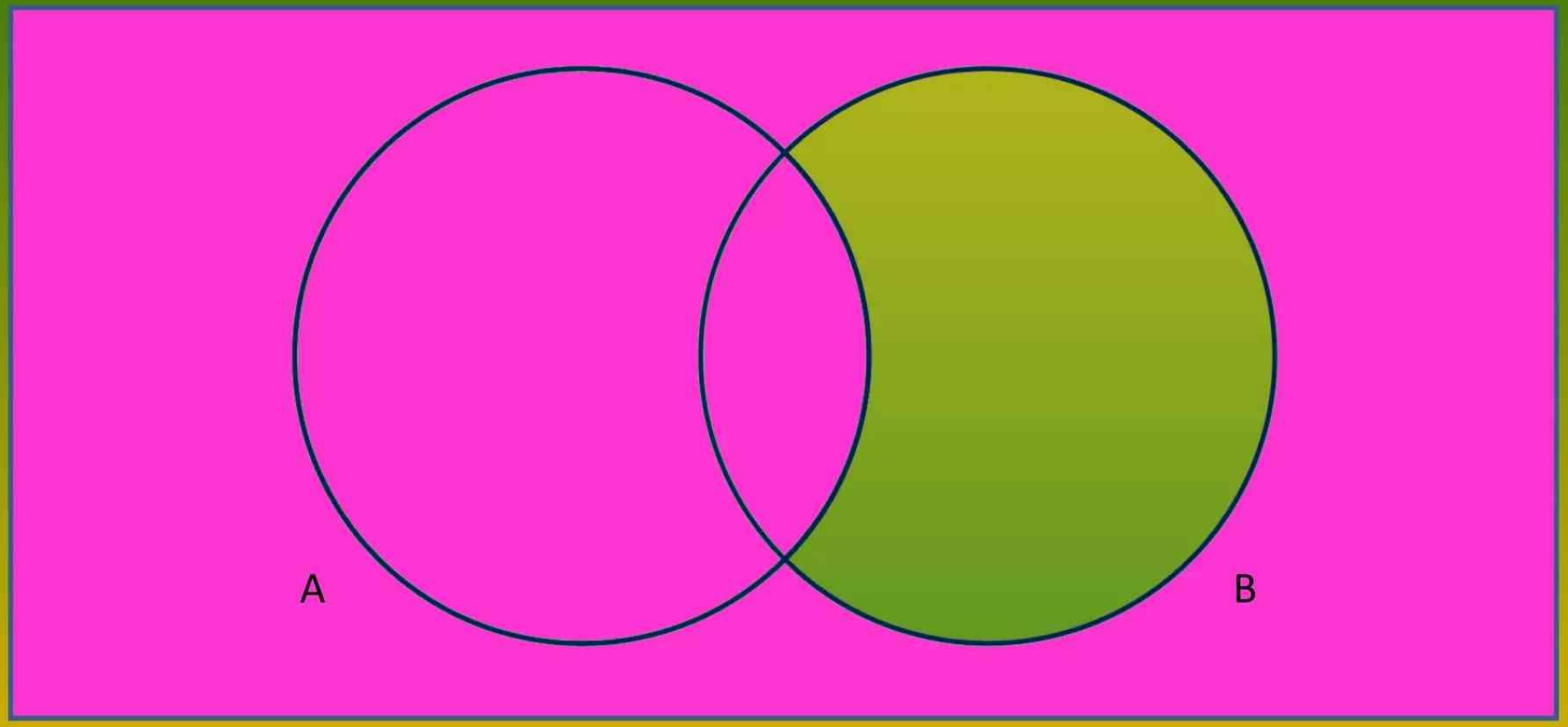
$n(\emptyset)=0$

$A \cup B'$



- **B'** is the **complement** of the set **B**
- It consists of all the elements in the **universal set** U that are **not** in B.

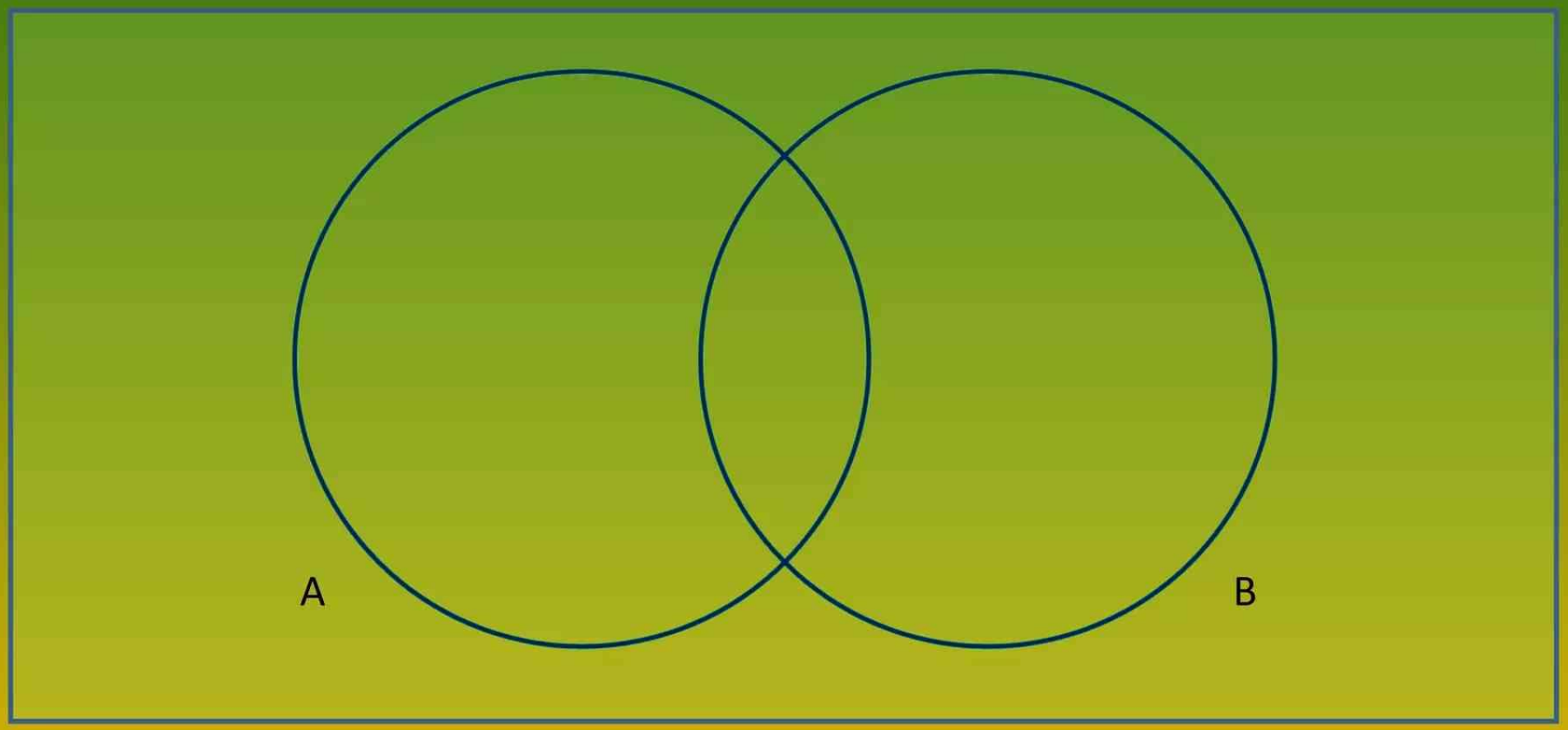
$A \cup B'$



Example:

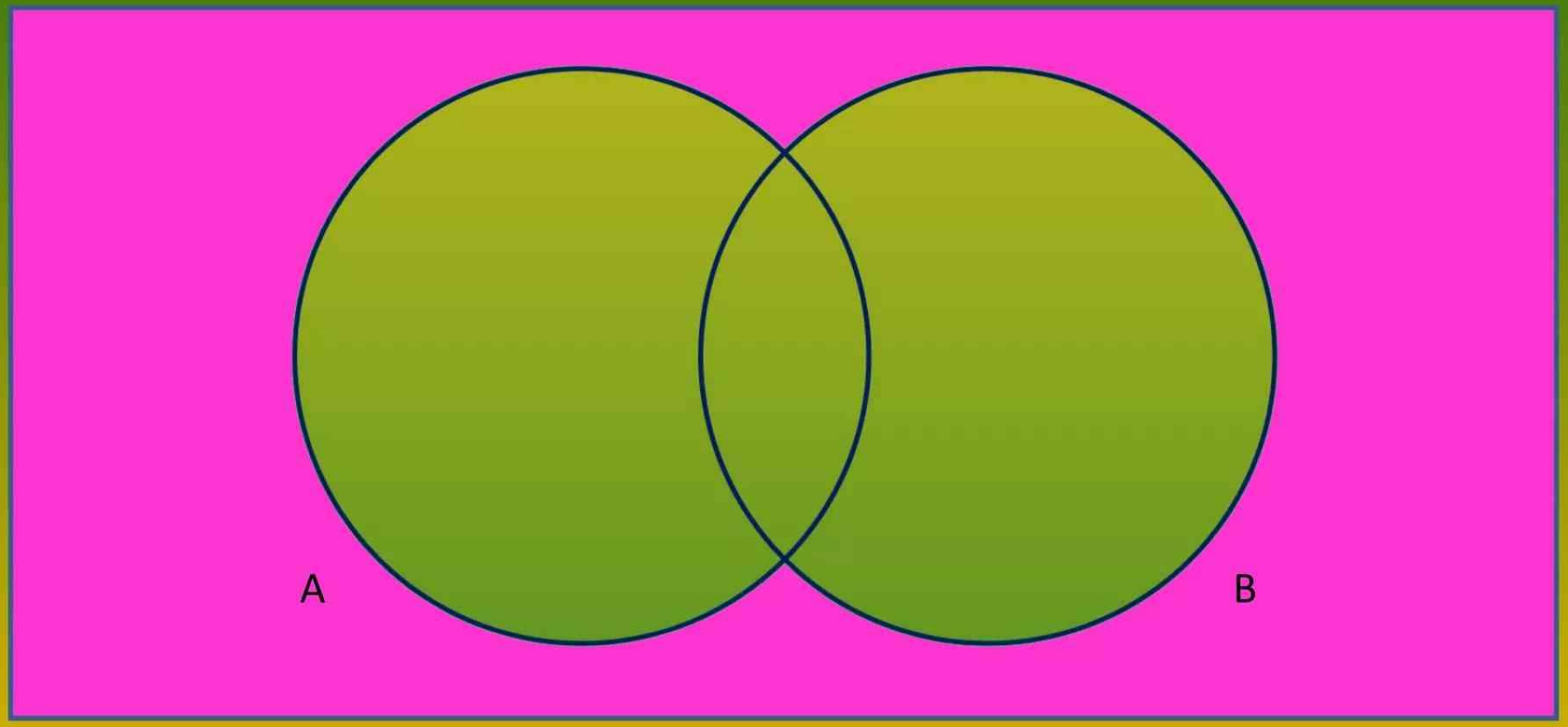
- Let the universal set U={1,2,3,4,5} and A={2,4}
- Then, A'={1,3,5}, because these are the elements in U that are not in A.

$A' \cap B'$



- The expression **A'∩B', A'** represents the **intersection of the complements** of sets A and B.
- In other words, it refers to the set of elements that are **not** in A **and** are **not** in B.

$A' \cap B'$

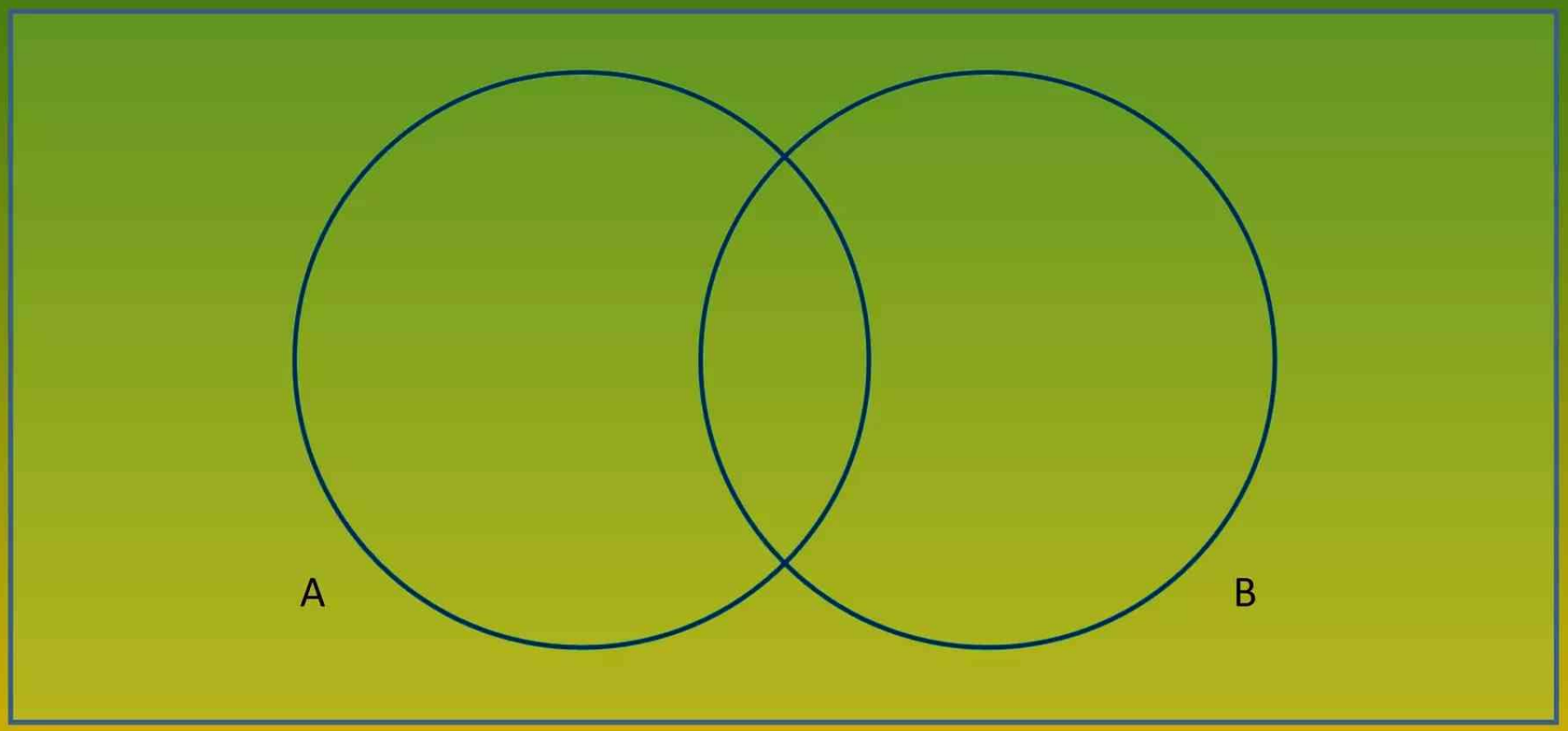


Example:

Let the universal set U={1,2,3,4,5} A={1,2} and B={2,3}

- The complement of A, A'={3,4,5} A'={3,4,5} (elements not in A).
- The complement of B, B'={1,4,5} B'={1,4,5} (elements not in B).

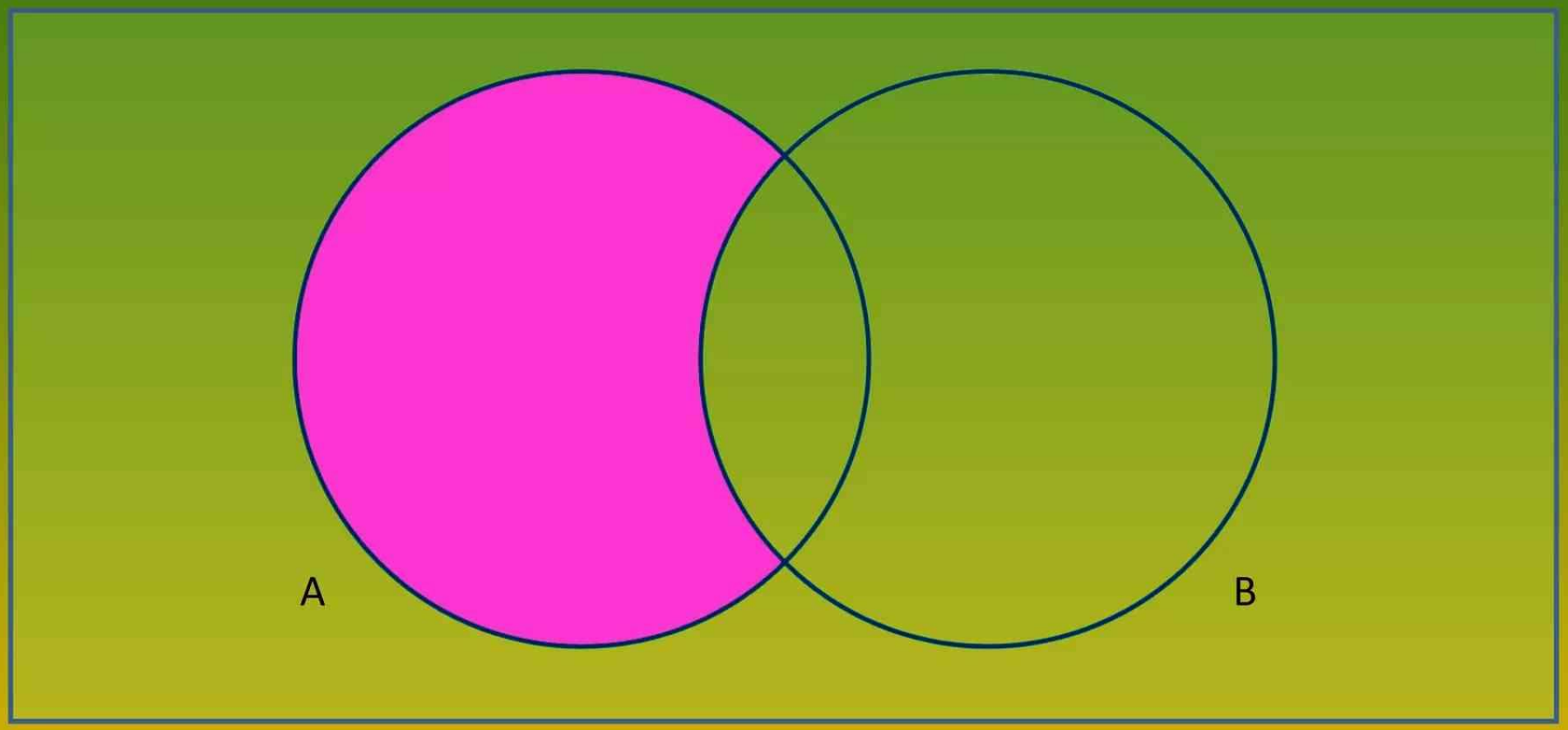
$A \cap B'$



The expression **A∩B'** represents the **intersection** of set A and the **complement** of set B. This refers to the set of elements that are:

- **In A**, and
- **Not in B**.

$A \cap B'$



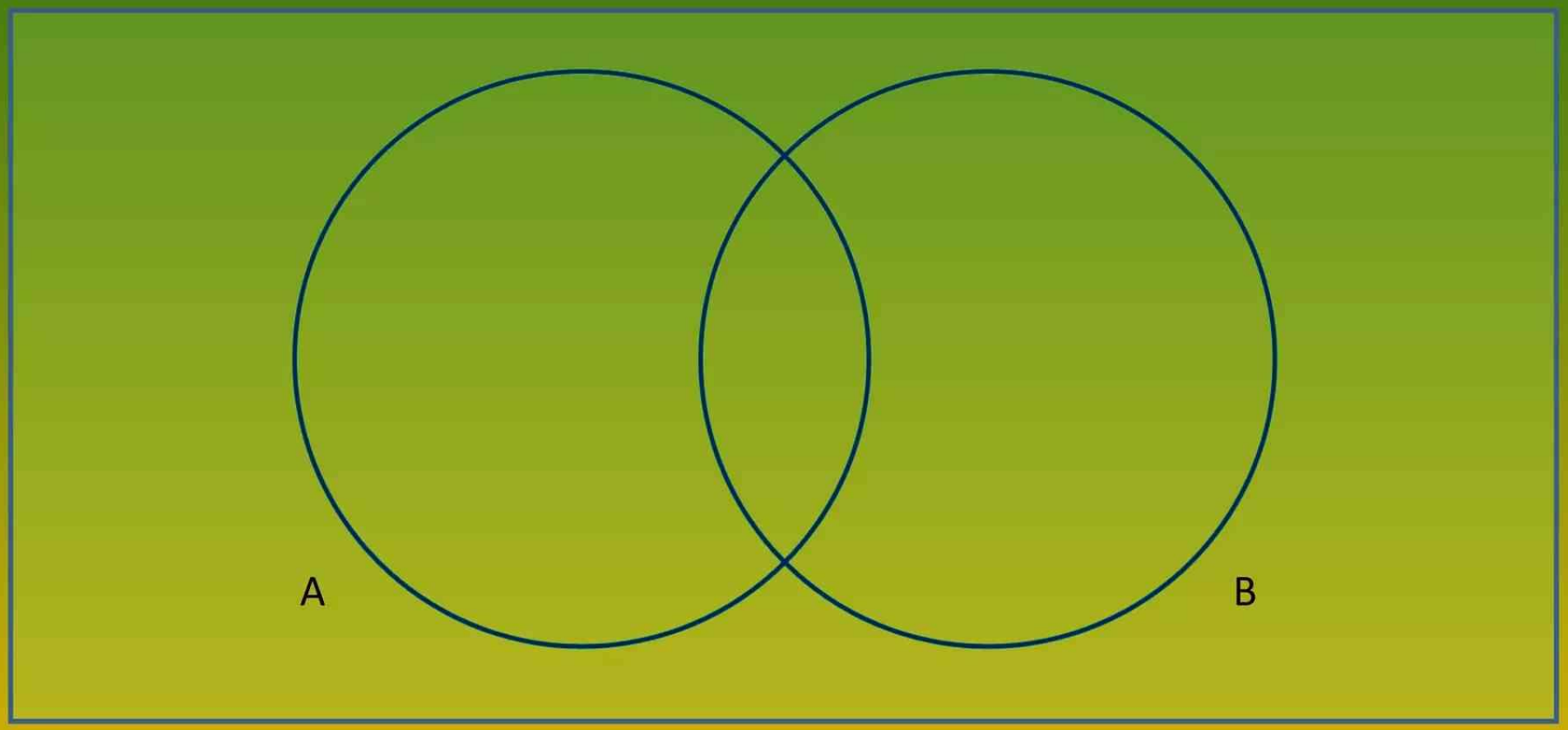
Example:

Let the universal set U={1,2,3,4,5}, A={1,2,4}, and B={2,3}

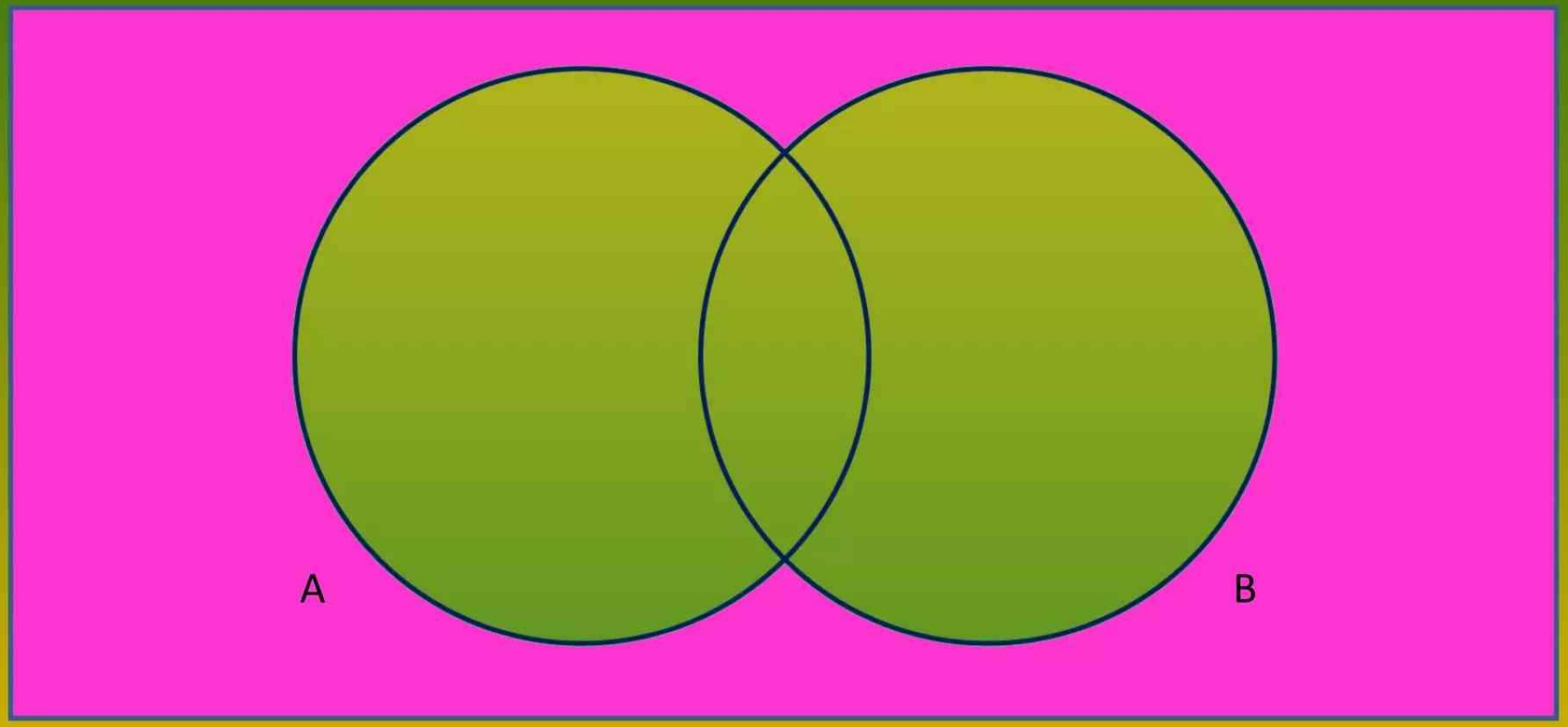
The complement of B, B'={1,4,5}

(all elements in the universal set that are not in B).

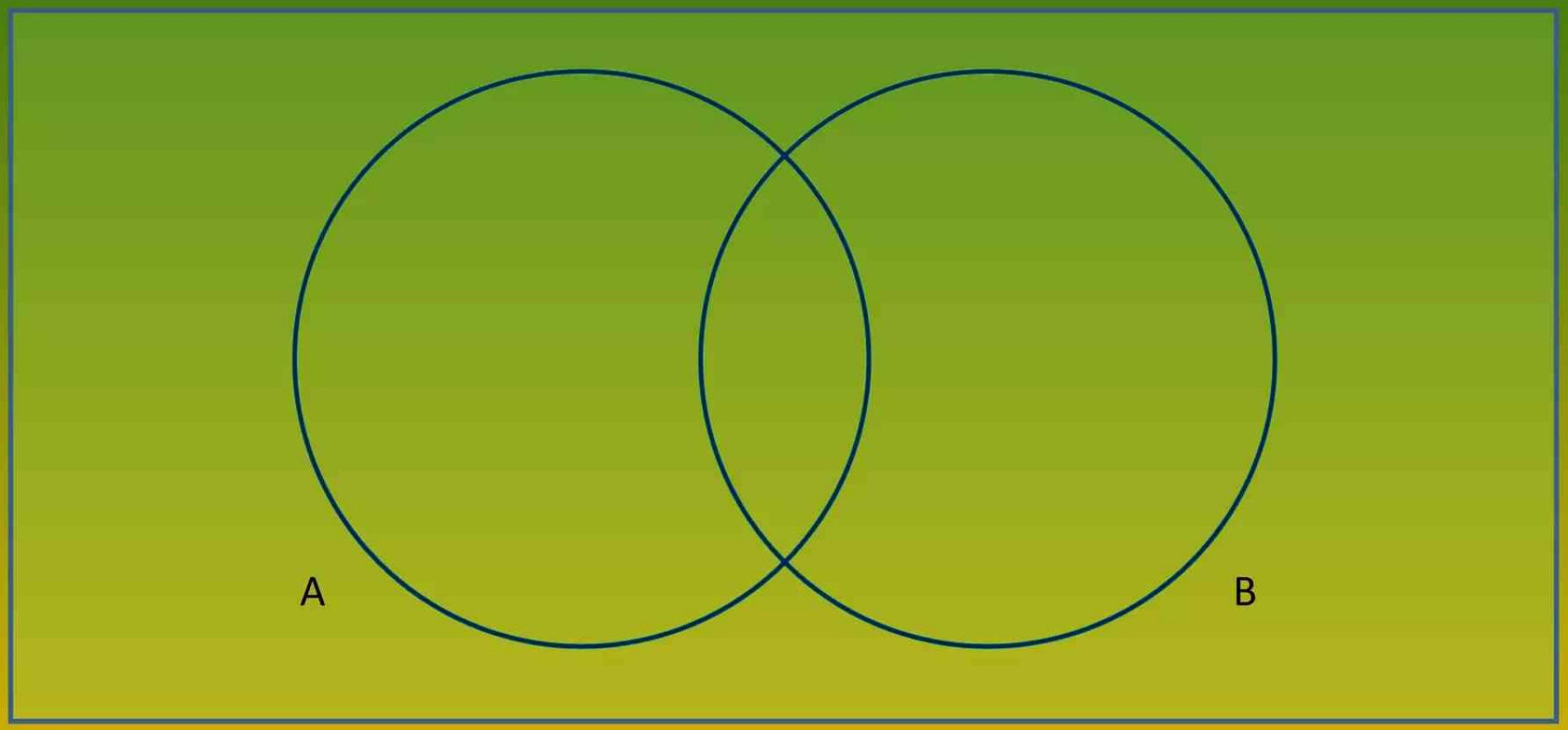
$(A \cup B)'$



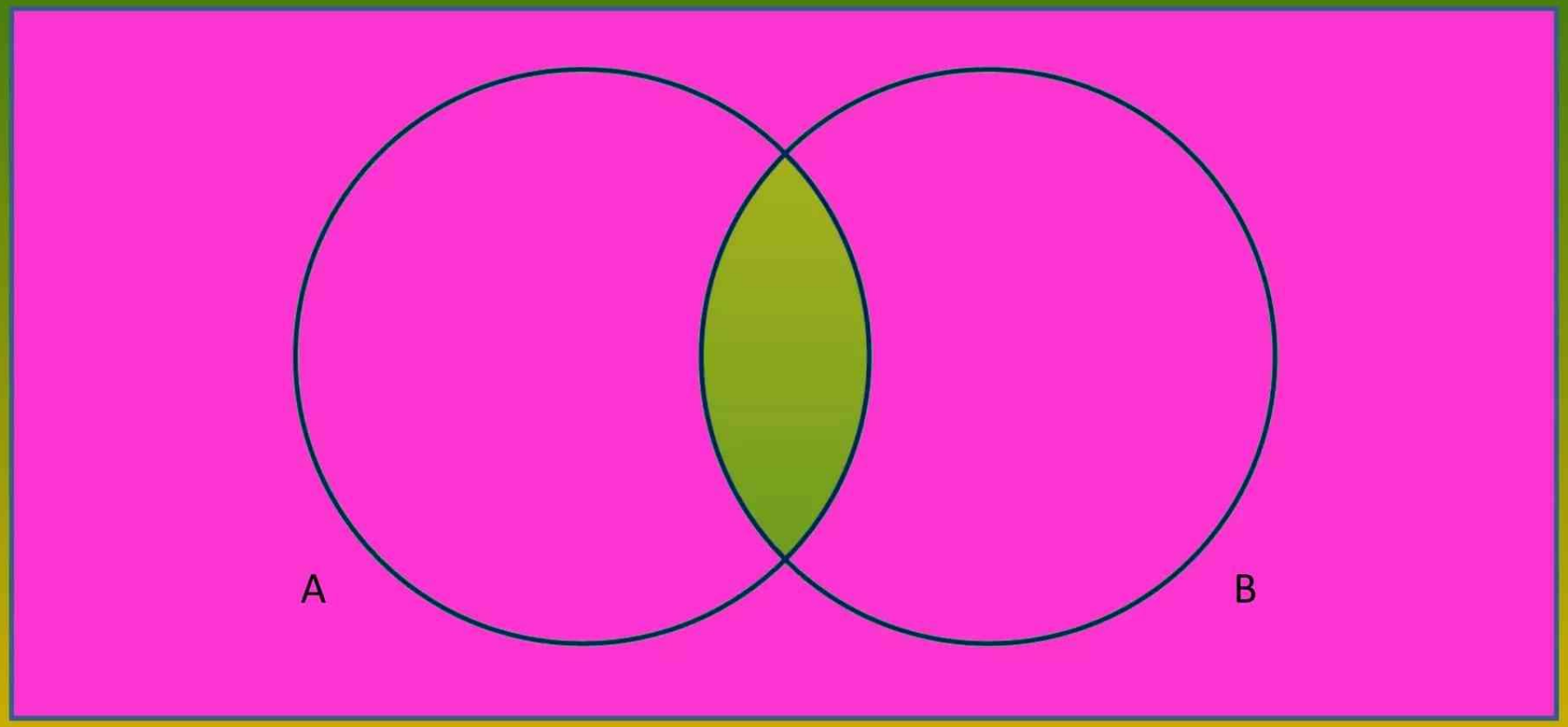
$(A \cup B)'$



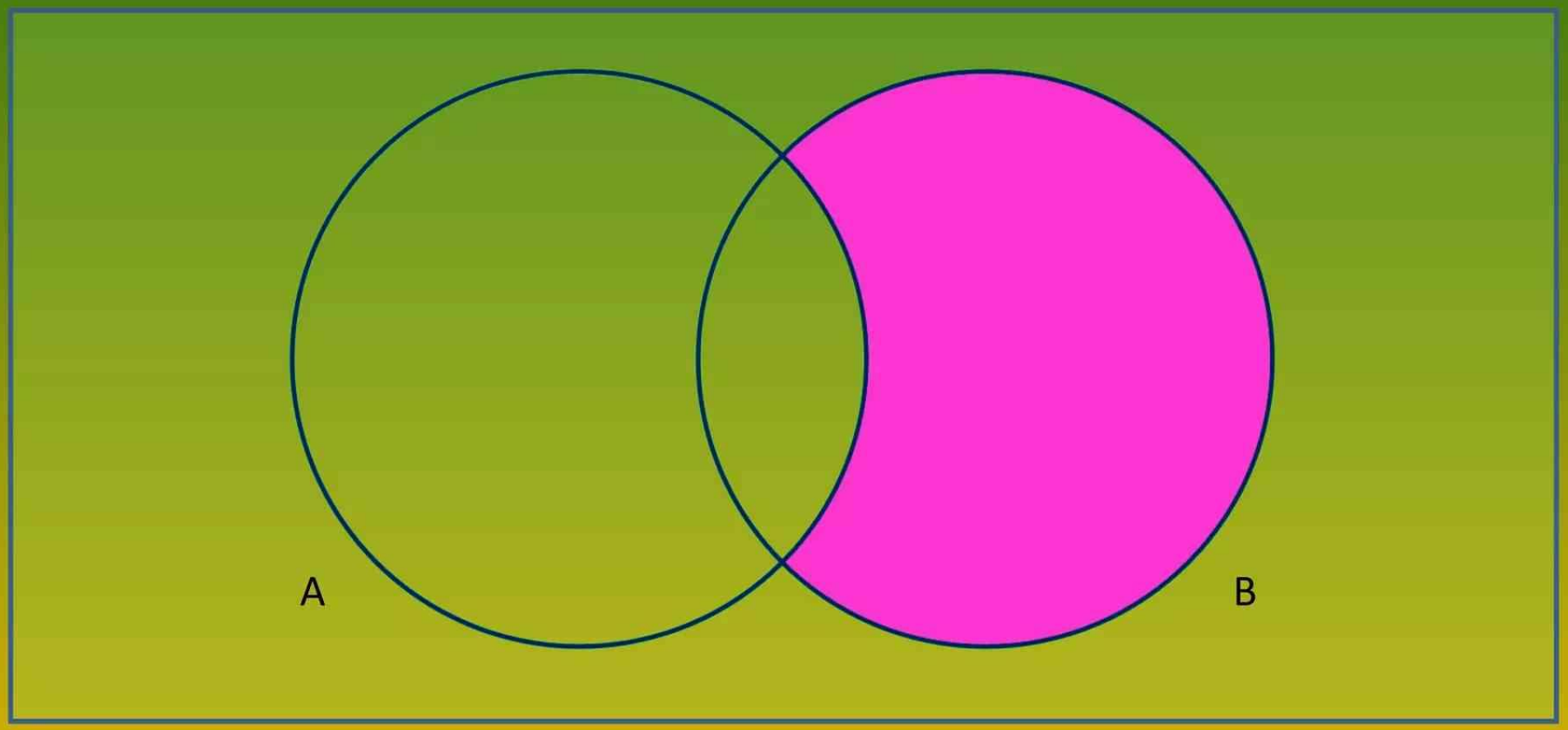
$A' \cup B'$



$A' \cup B'$

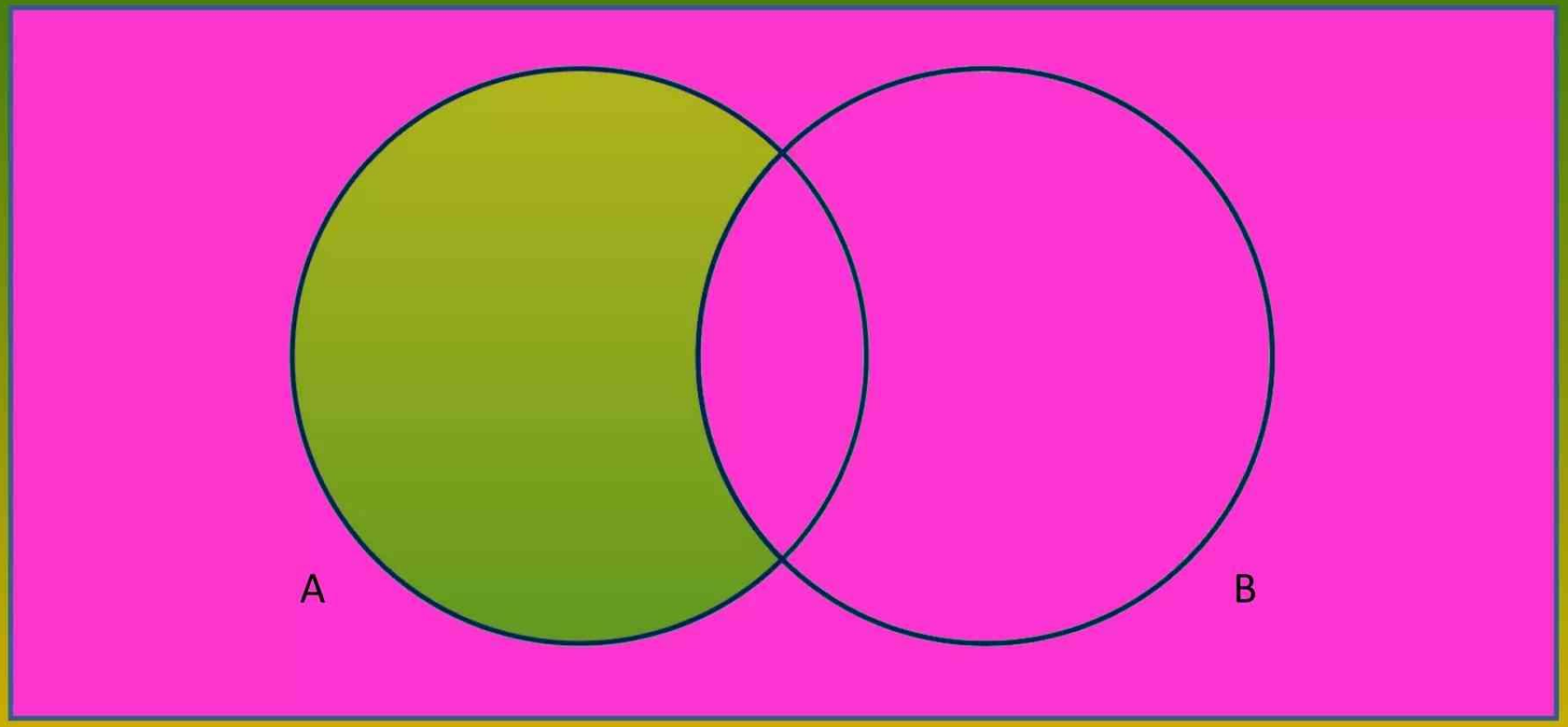


What is the shaded region?



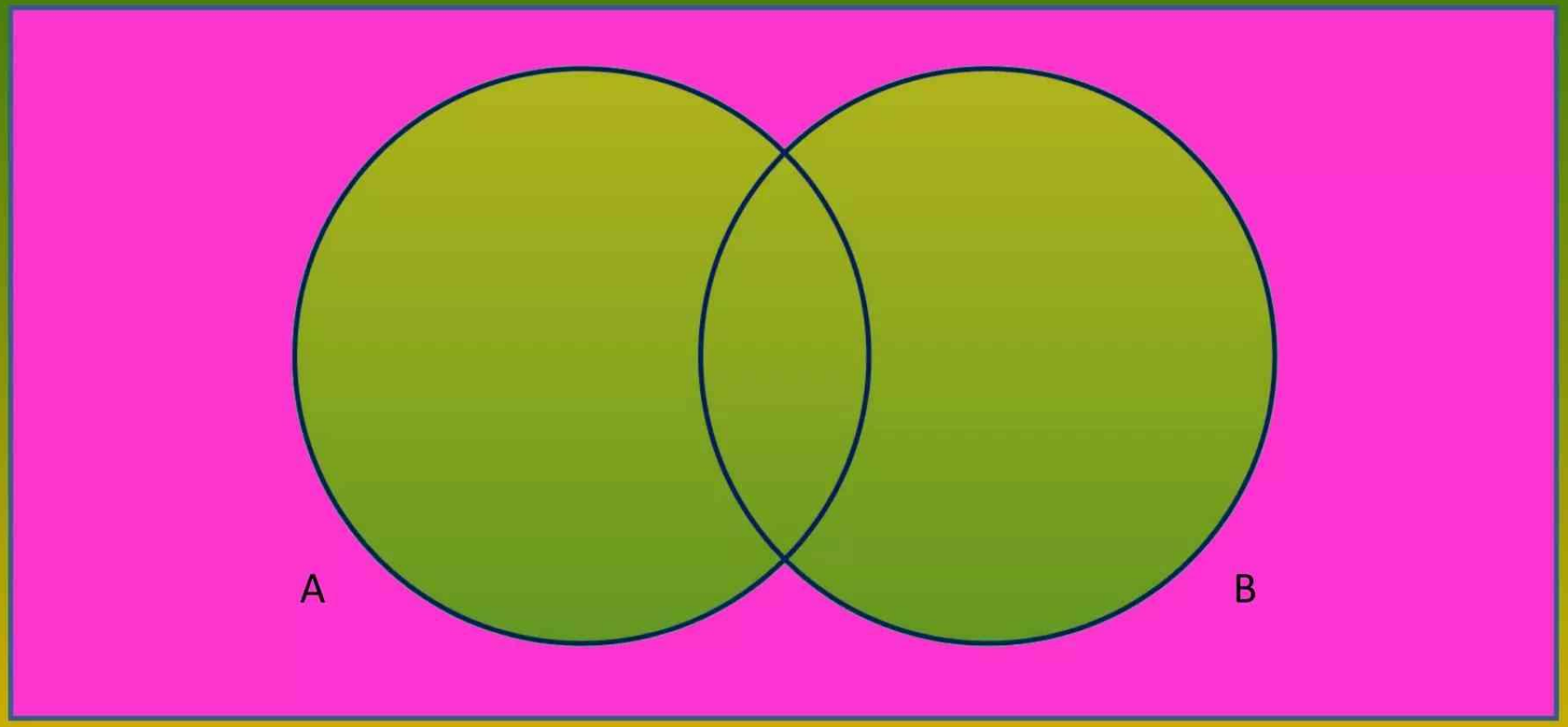
$(B \cap A')$

What is the shaded region?



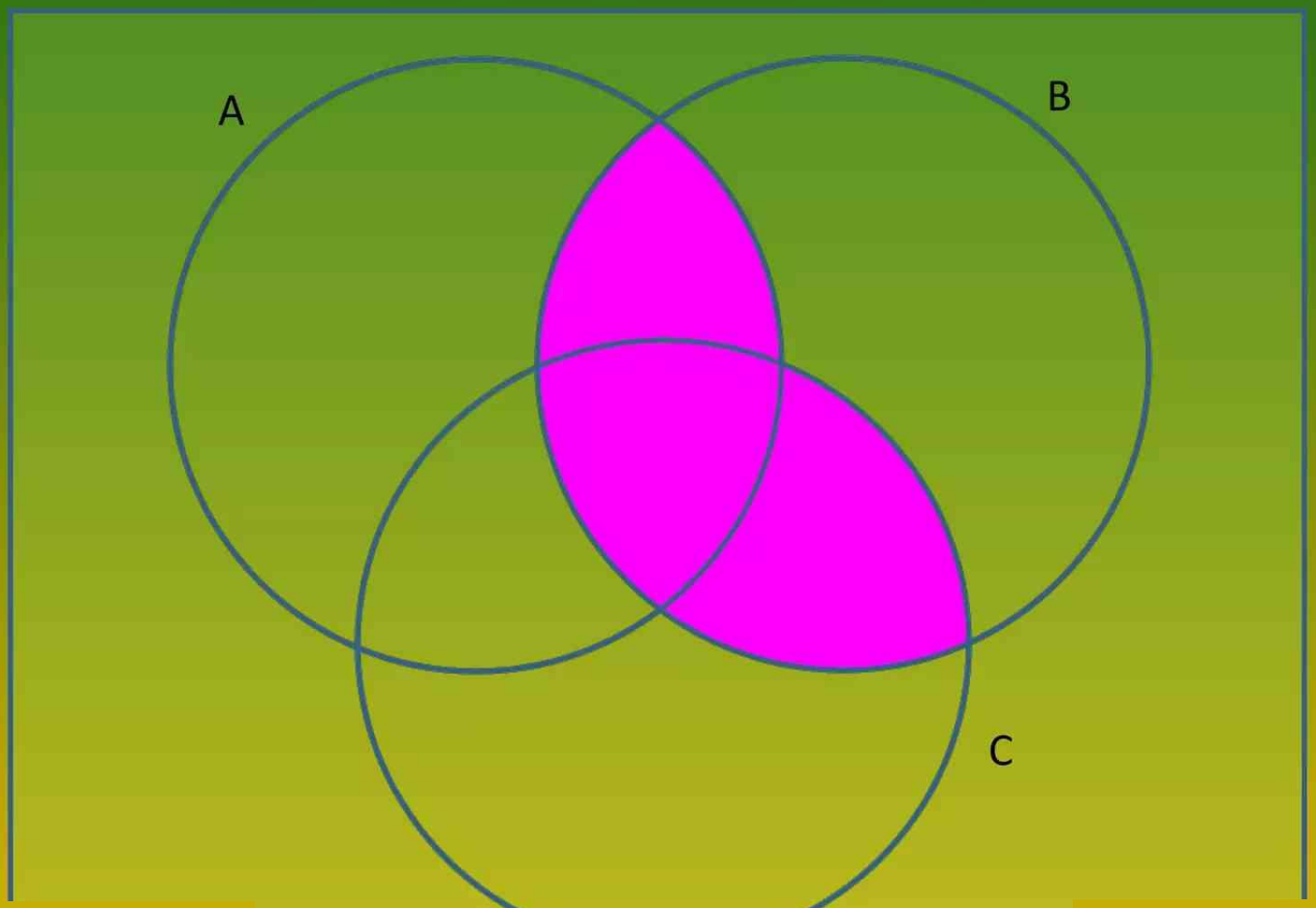
$(A' \cup B)$

What is the shaded region?



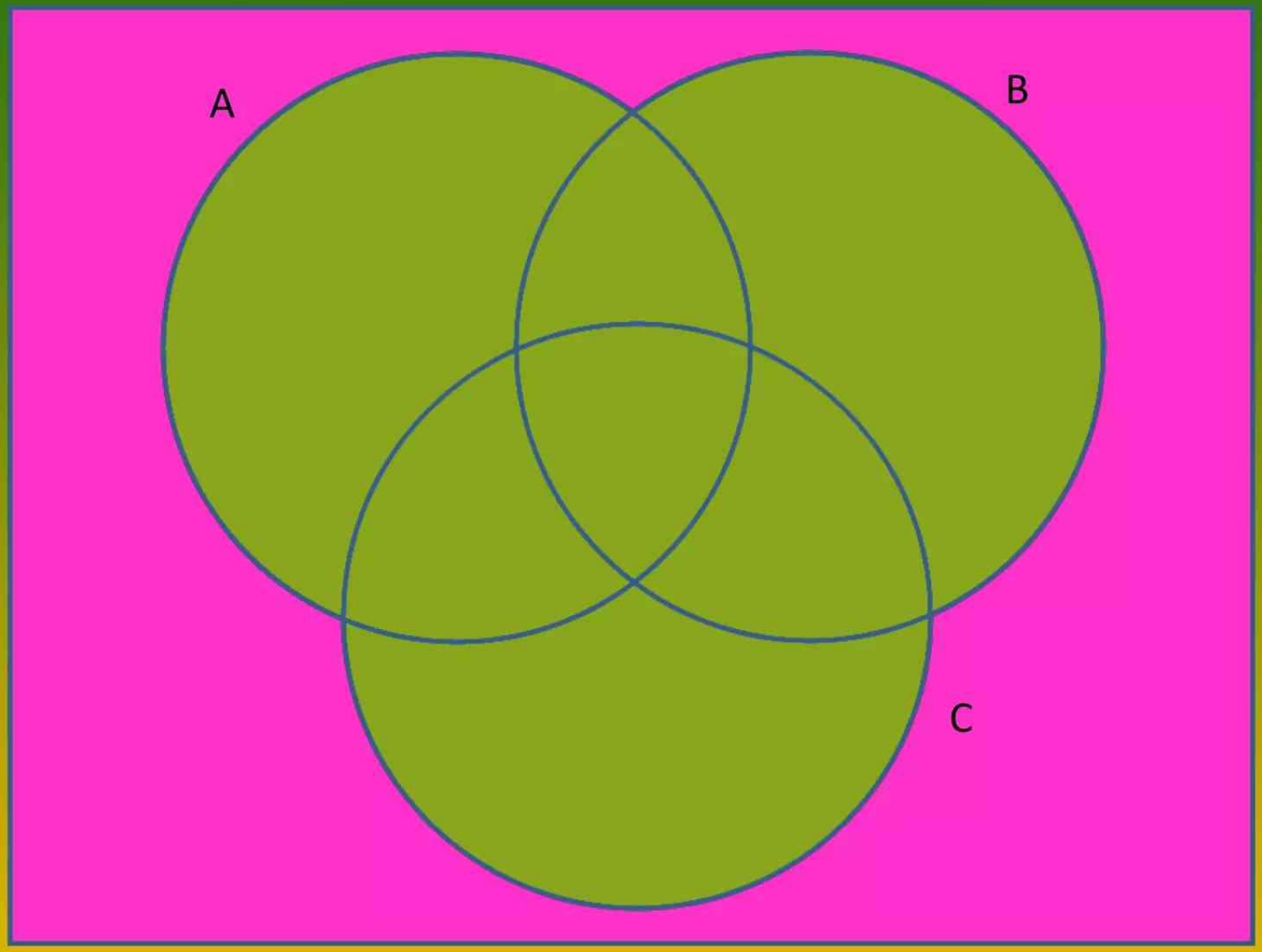
$(A \cup B)'$

What is the shaded region?



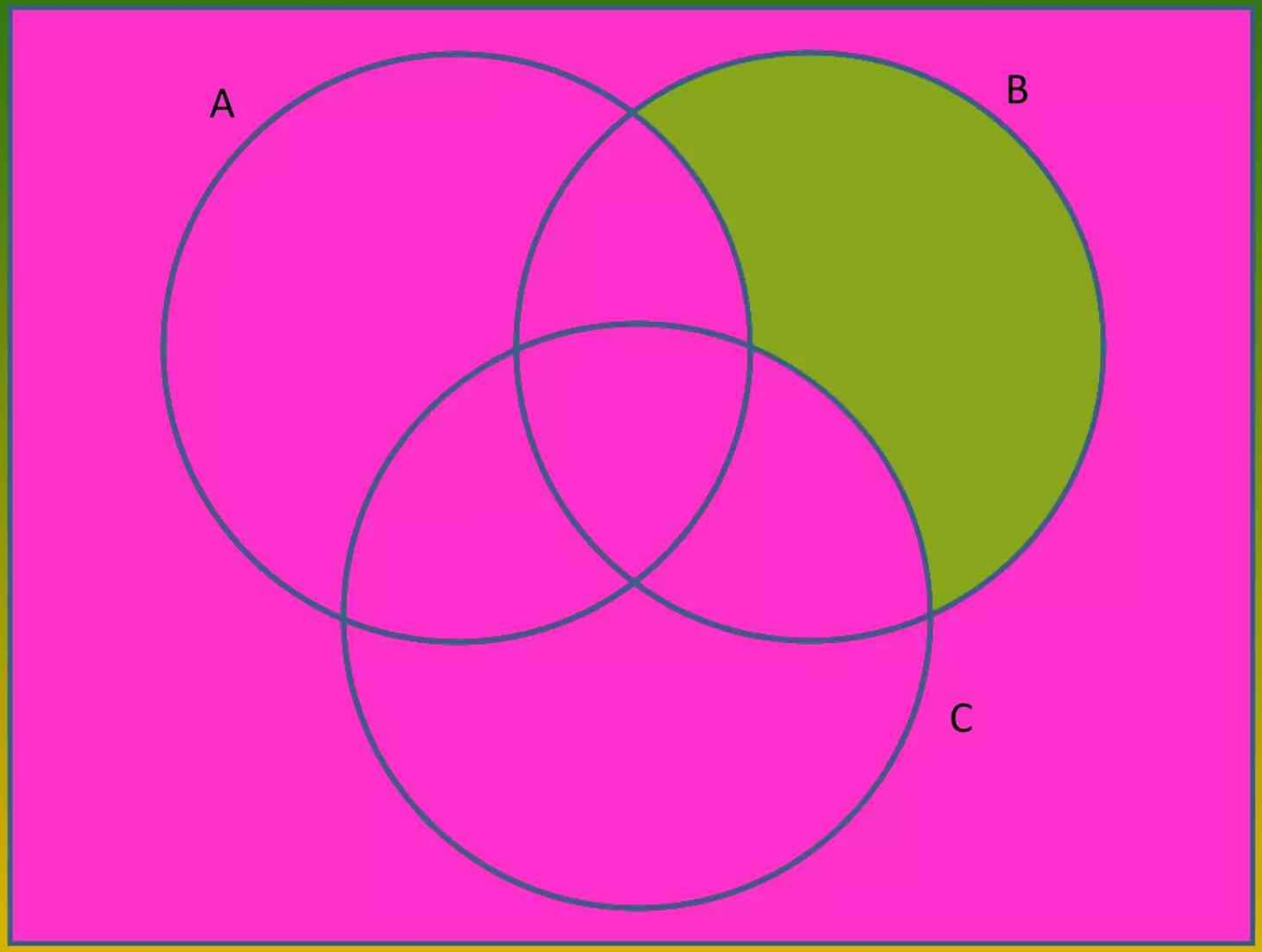
$B \cap (A \cup C)$

What is the shaded region?

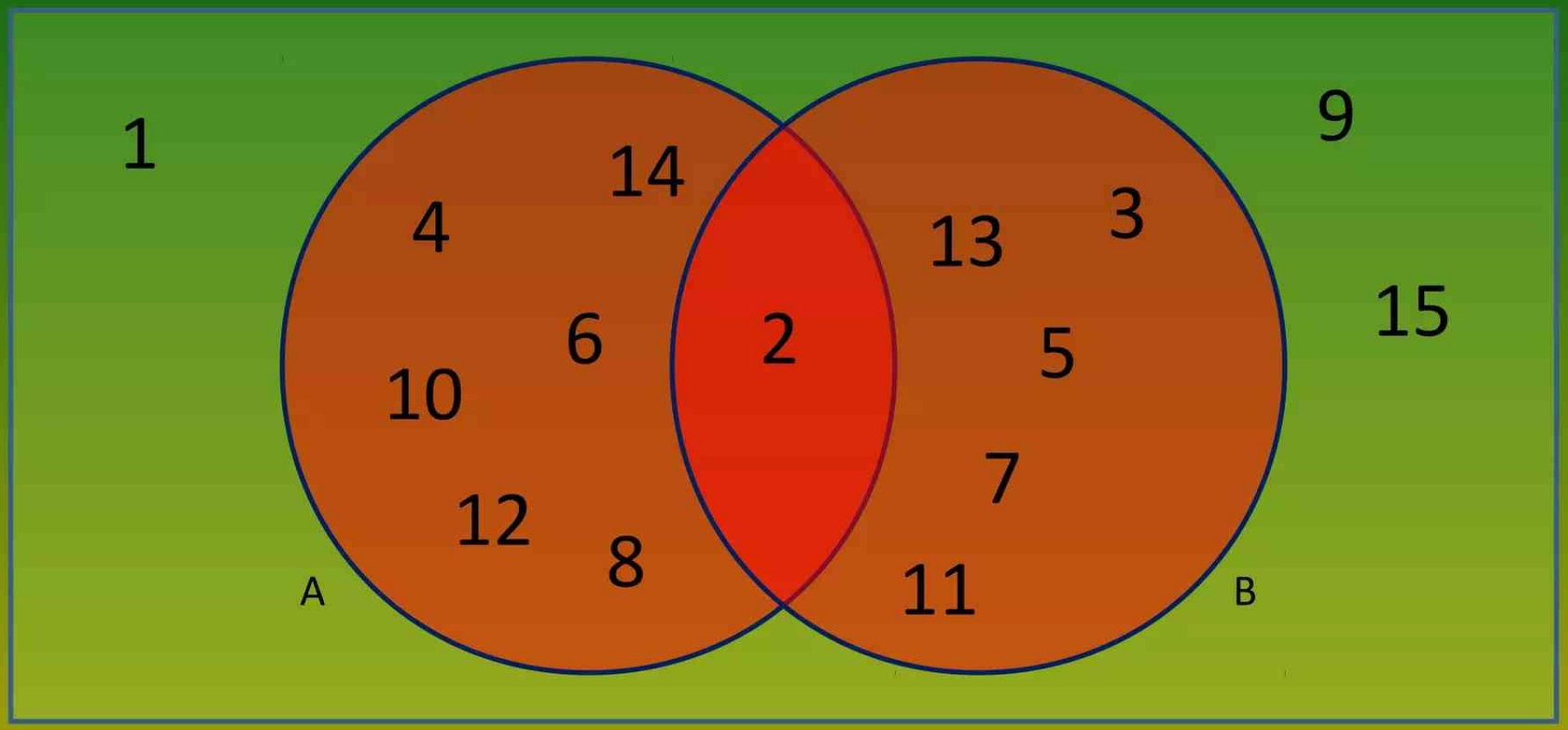


$(A \cup B \cup C)'$

What is the shaded region?



$(A \cup C \cup B')$

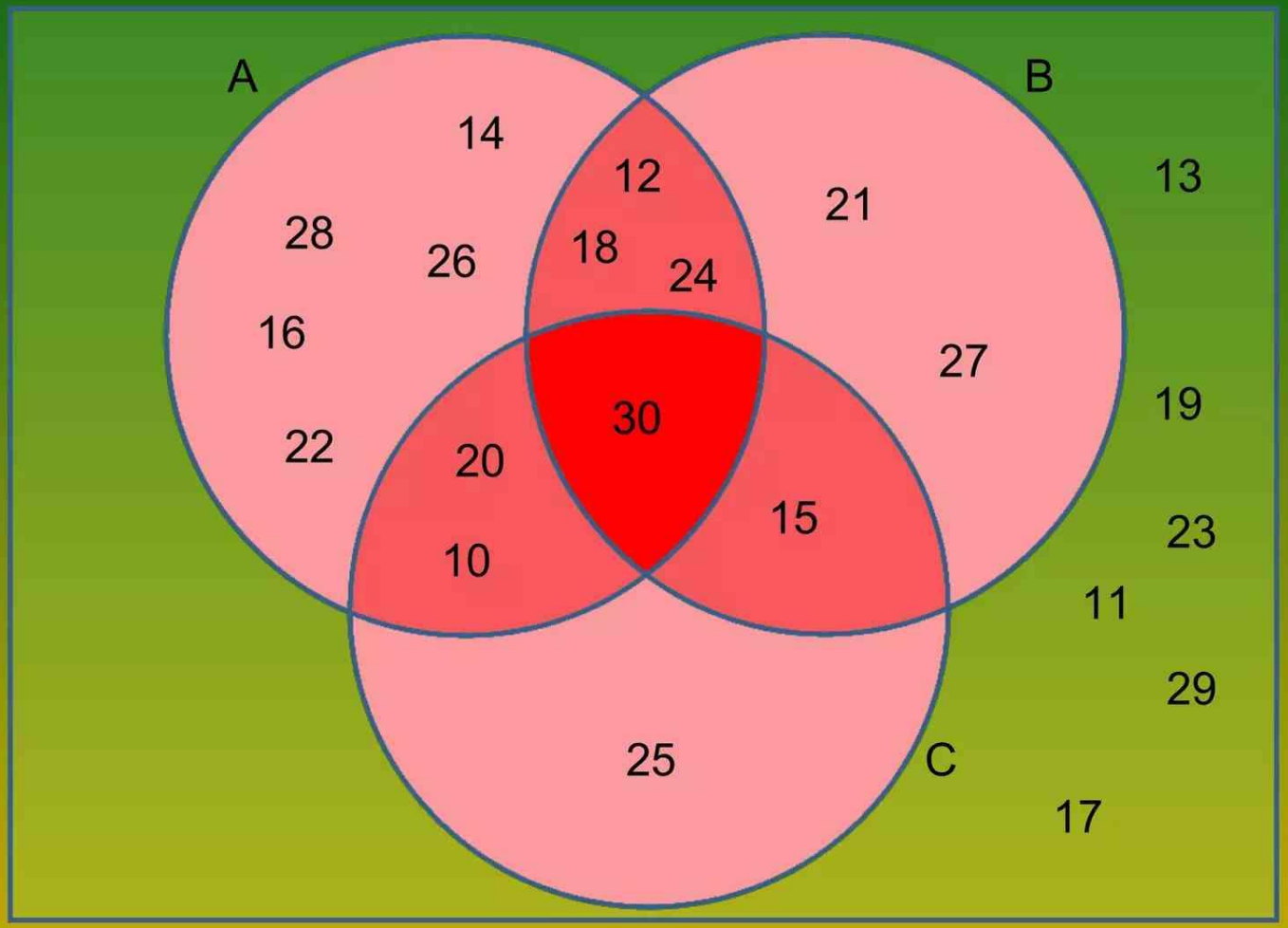


U = {Natural Numbers less than 16}

Describe set A and set B

A = {Even Numbers}

B = {Prime Numbers}



Describe Sets U, A, B and C

U = {10,11,12,13,14,.....29,30}

A = {Even Numbers}

B = {Multiples of 3}

C = {Multiples of 5}