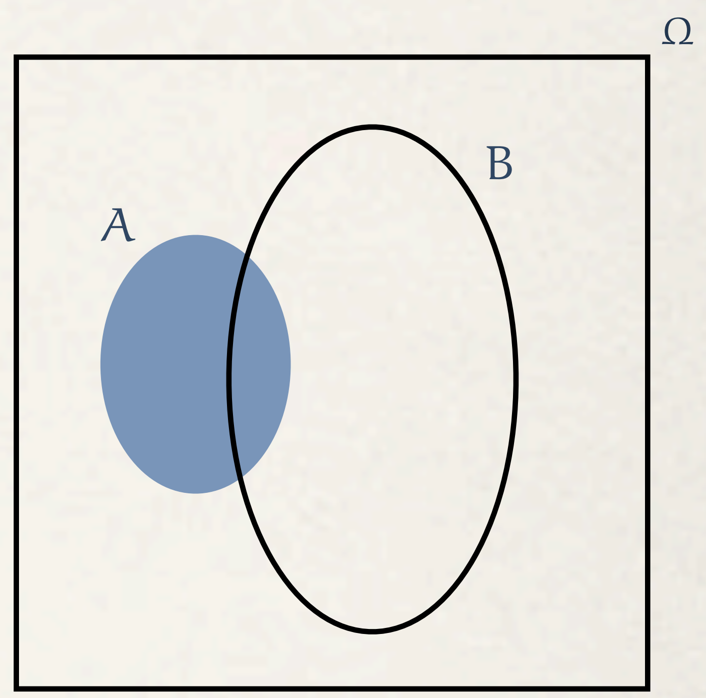
Basic manoeuvres with sets

Set operations: New sets from old



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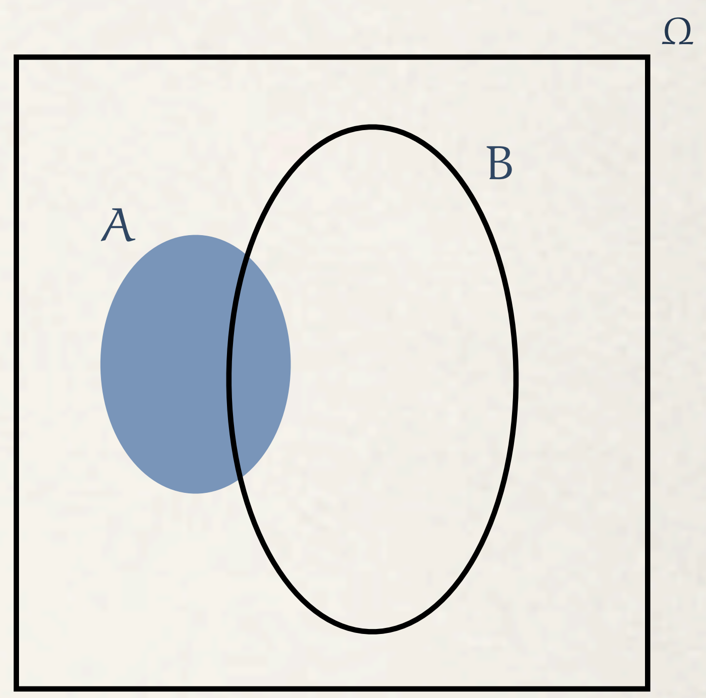
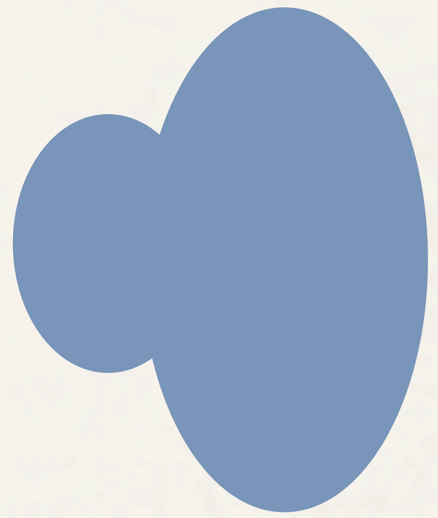
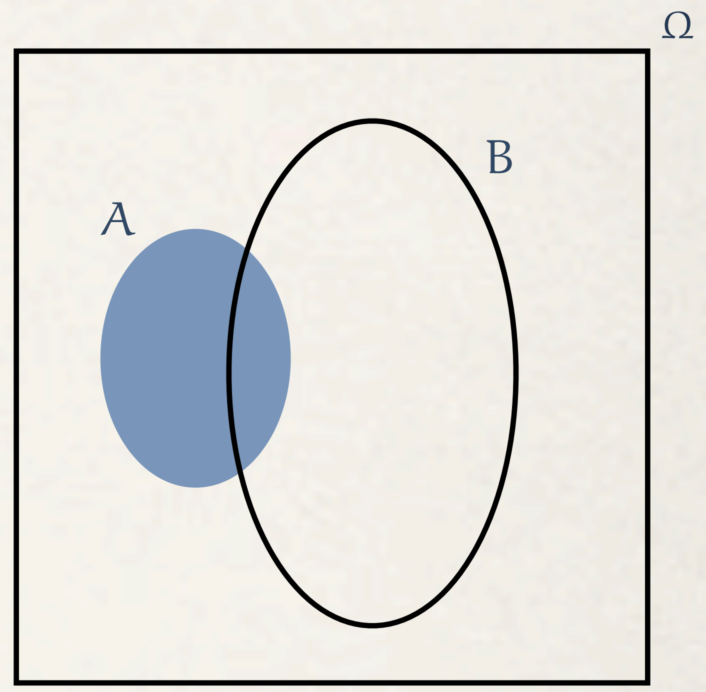


- *Union* (OR):

$$A \cup B = \{\omega : \omega \in A \text{ or } \omega \in B\}$$

ω is in A or in B (or both)





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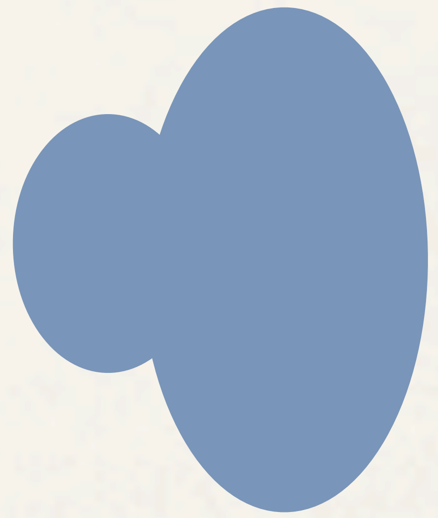

- *Intersection* (AND): $A \cap B = \{\omega : \omega \in A \text{ and } \omega \in B\}$

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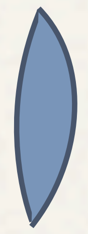

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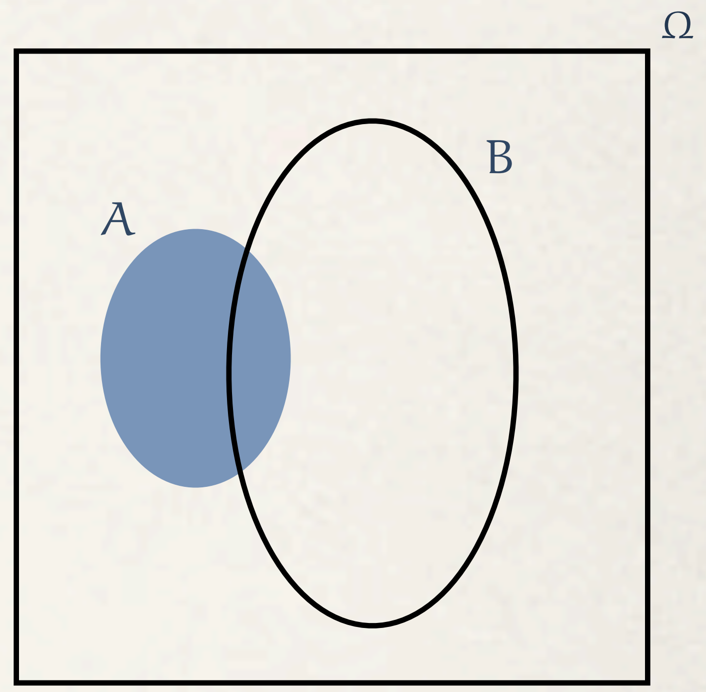

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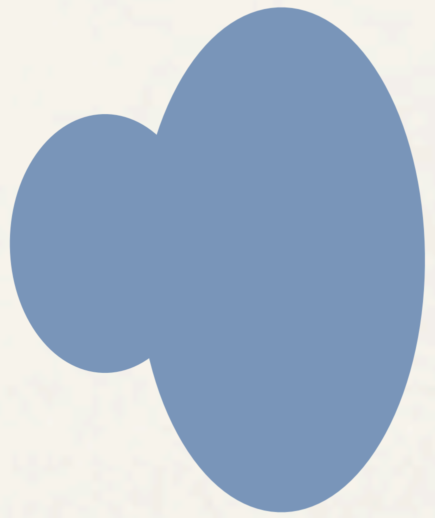

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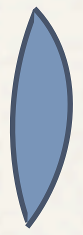
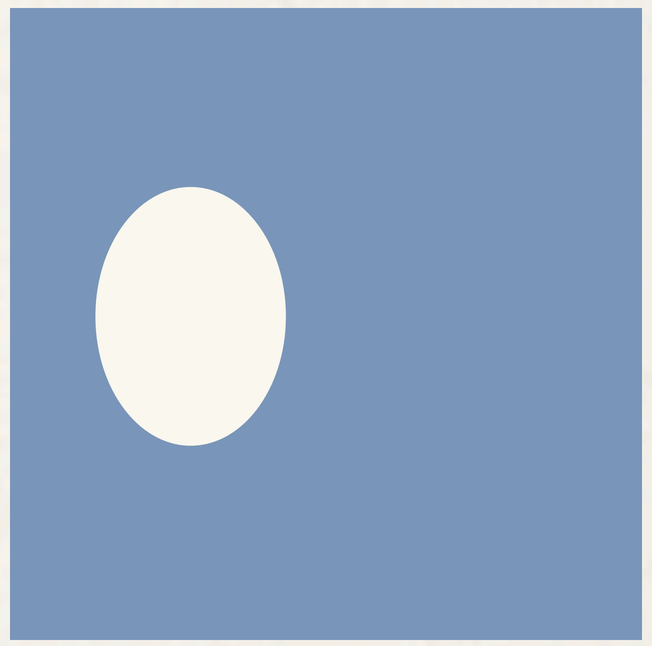


- *Complement* (NOT): $A^{c} = \{\, \omega : \omega \notin A \,\}$

  ω is not in A



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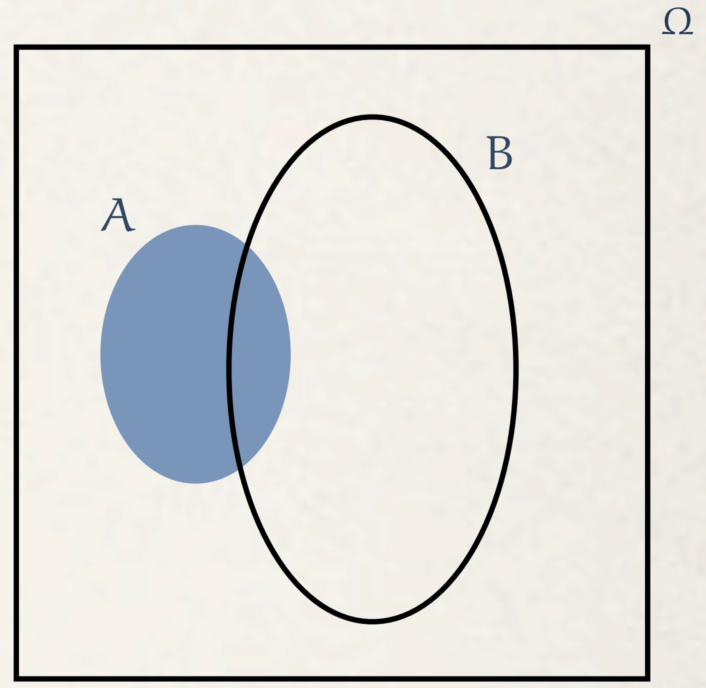

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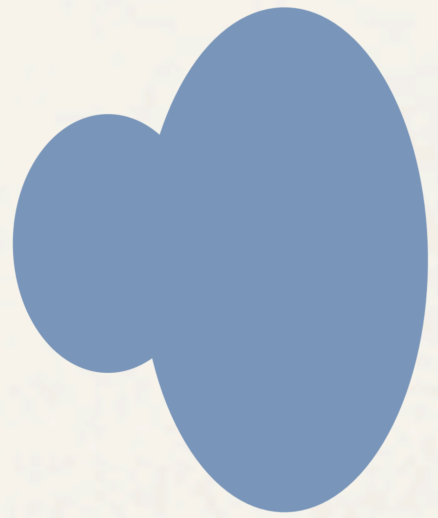

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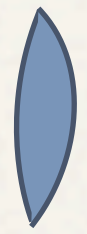

- *Complement* (NOT): $A^{C} = \{\omega : \omega \notin A\}$

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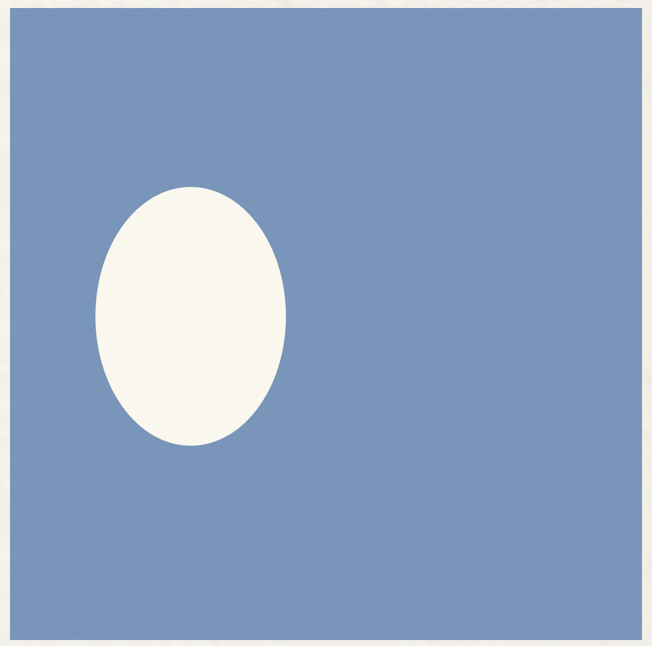
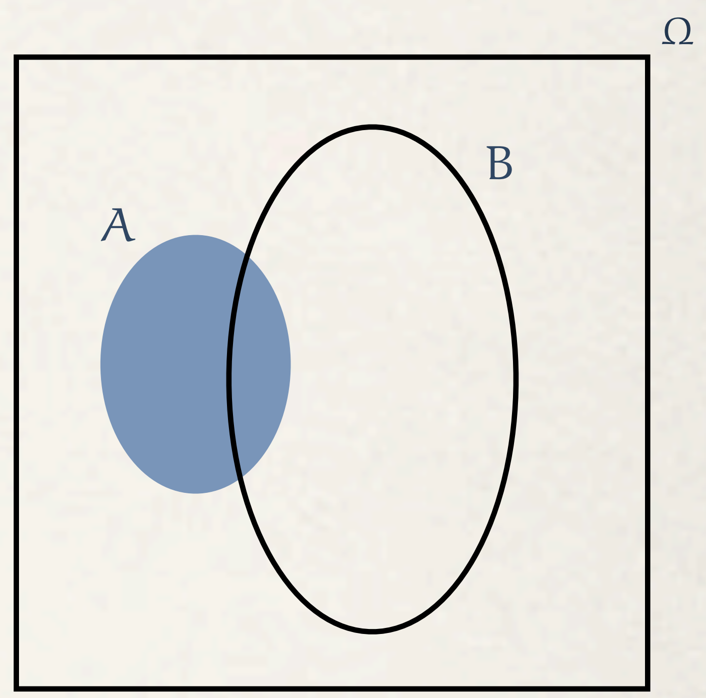
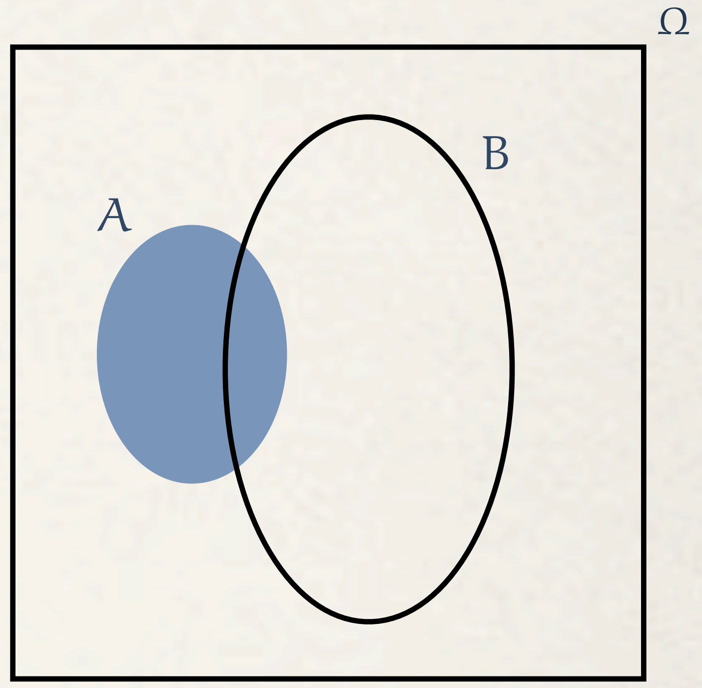


What is the set $(A^{C})^{C}$ obtained by complementing the complement of A? Identify it on the Venn diagram.

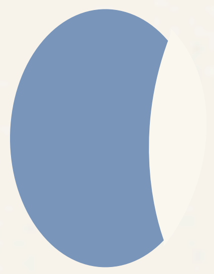

Ω
A
B

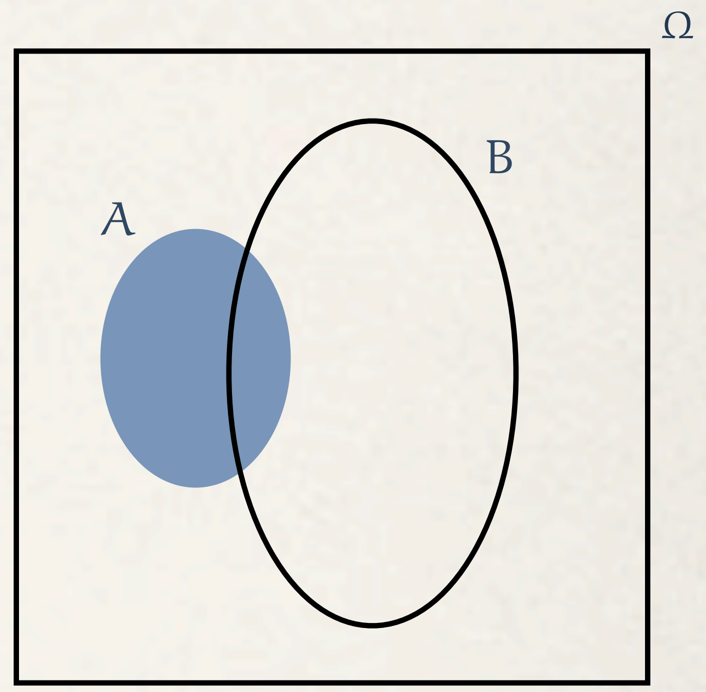


- *Set Difference*:

$$A \setminus B = \{\, \omega : \omega \in A \text{ and } \omega \notin B \,\} = A \cap B^c$$

ω is in A and not in B





- *Set Difference*:

$$A \setminus B = \{\omega : \omega \in A \text{ and } \omega \notin B\} = A \cap B^{c}$$

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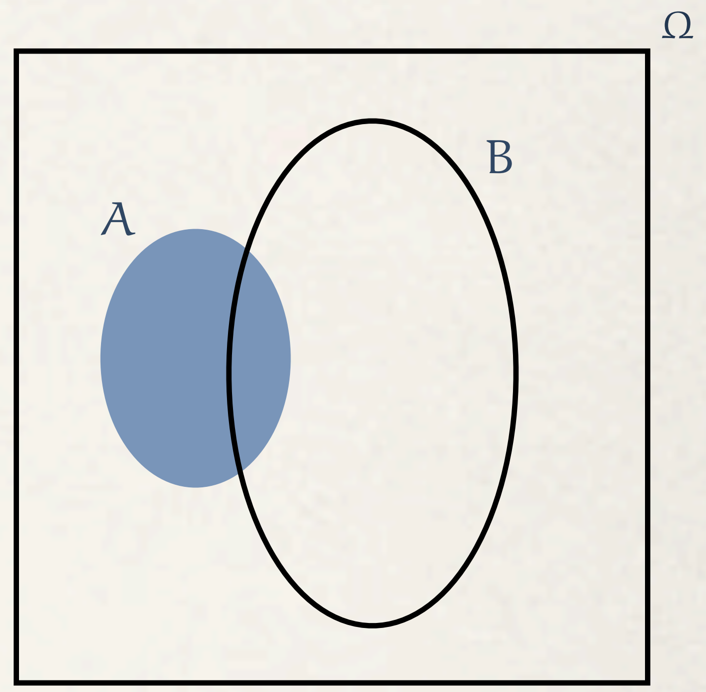
What is the set $B \setminus A$? Identify it on the Venn diagram.



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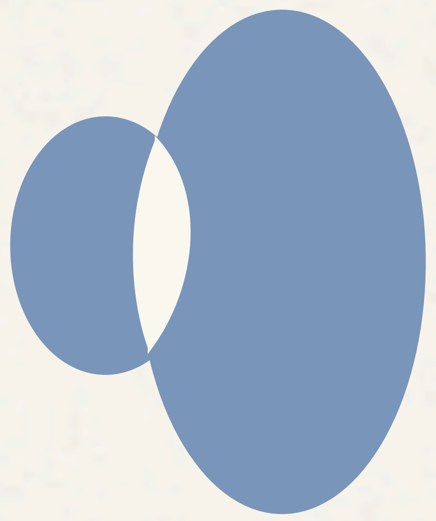
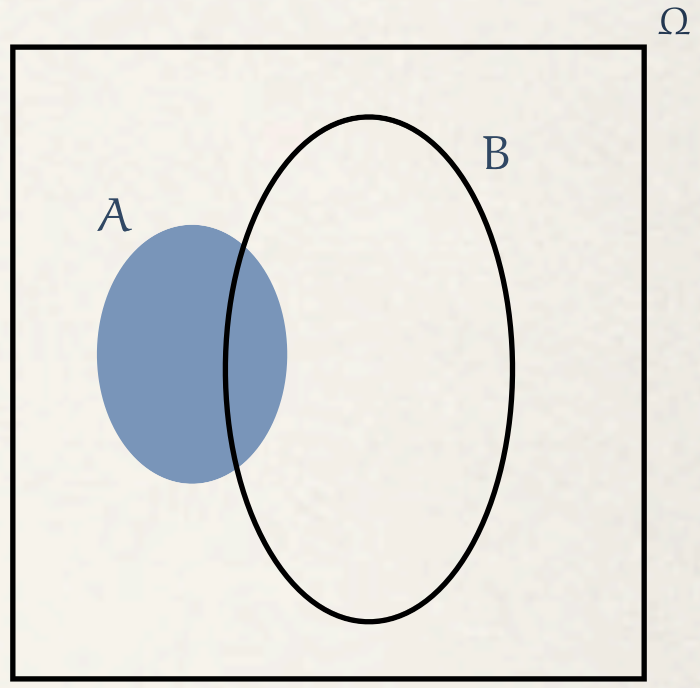
What is the set $B \setminus A$? Identify it on the Venn diagram.

- *Symmetric Difference* (XOR): $A \triangle B = \{ \omega : \omega \in A \setminus B \text{ or } \omega \in B \setminus A \} = (A \setminus B) \cup (B \setminus A)$

ω is in precisely one of A and B





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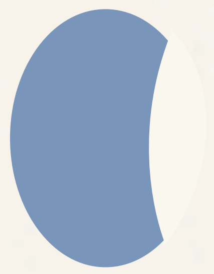

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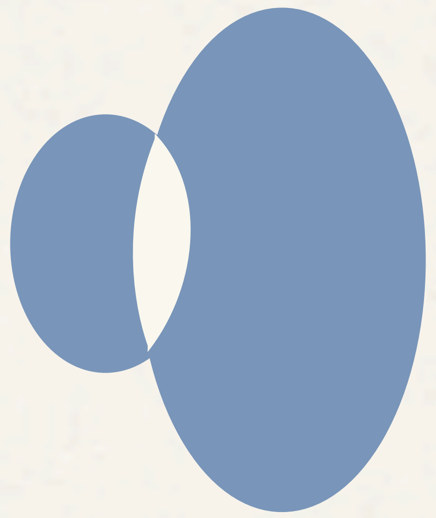

If A and B are disjoint, verify that $A \triangle B = A \cup B$.