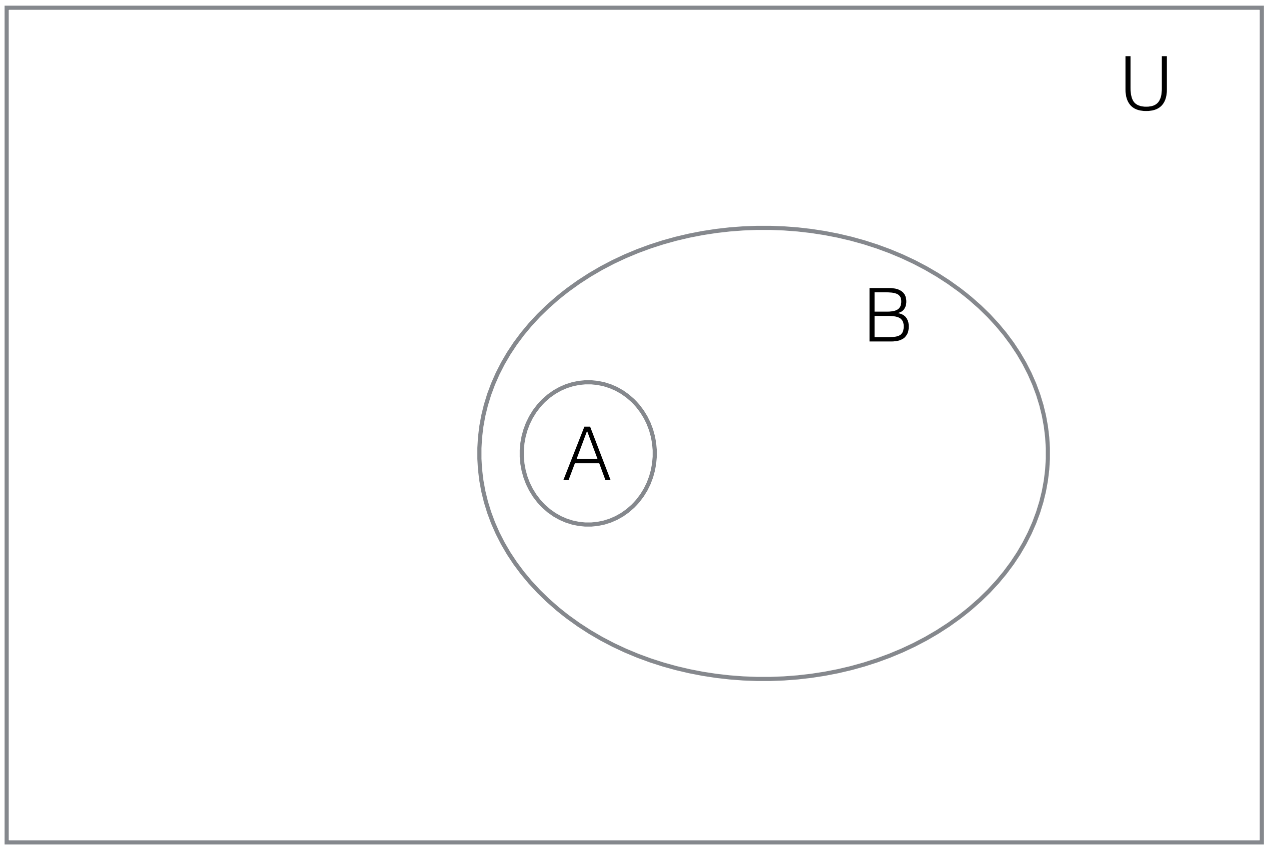
2.1 Examples

Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.

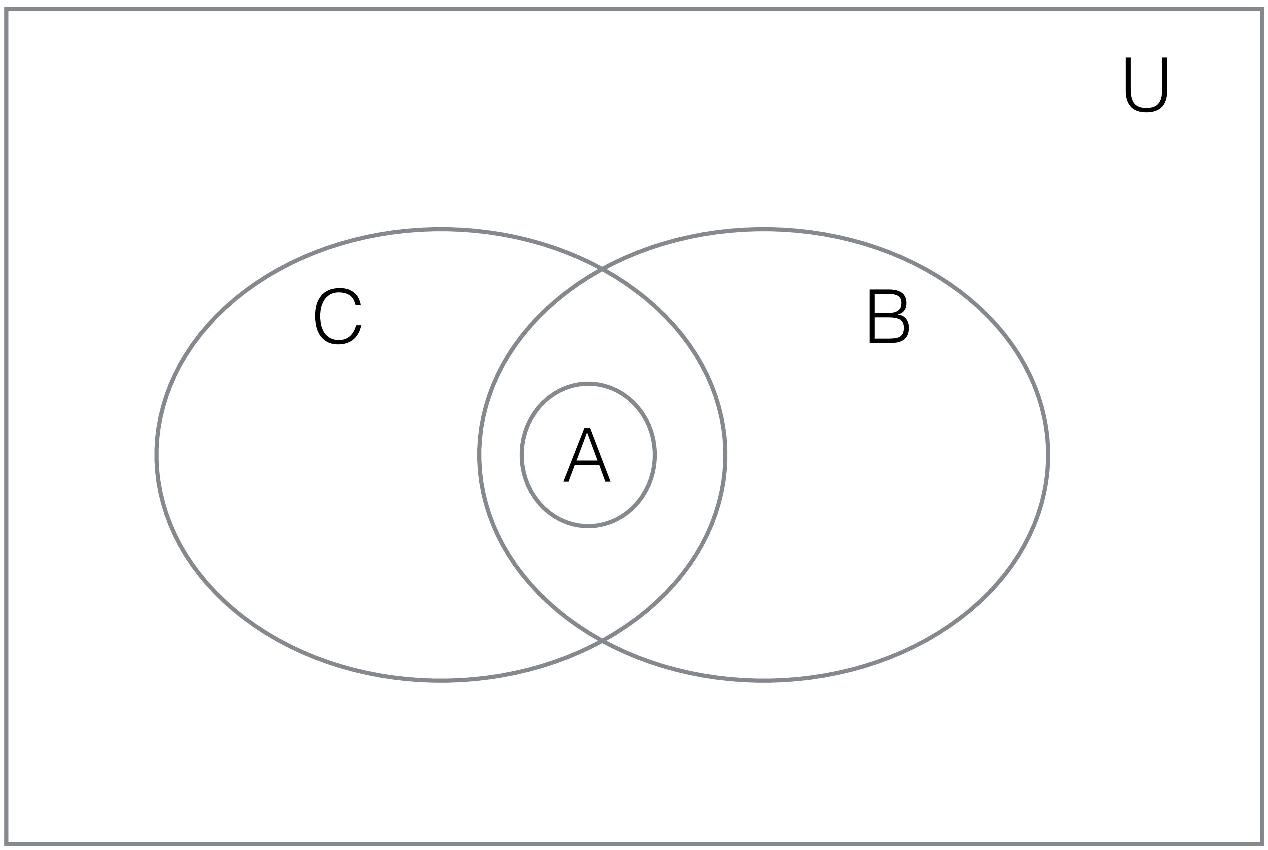
Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.

Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.

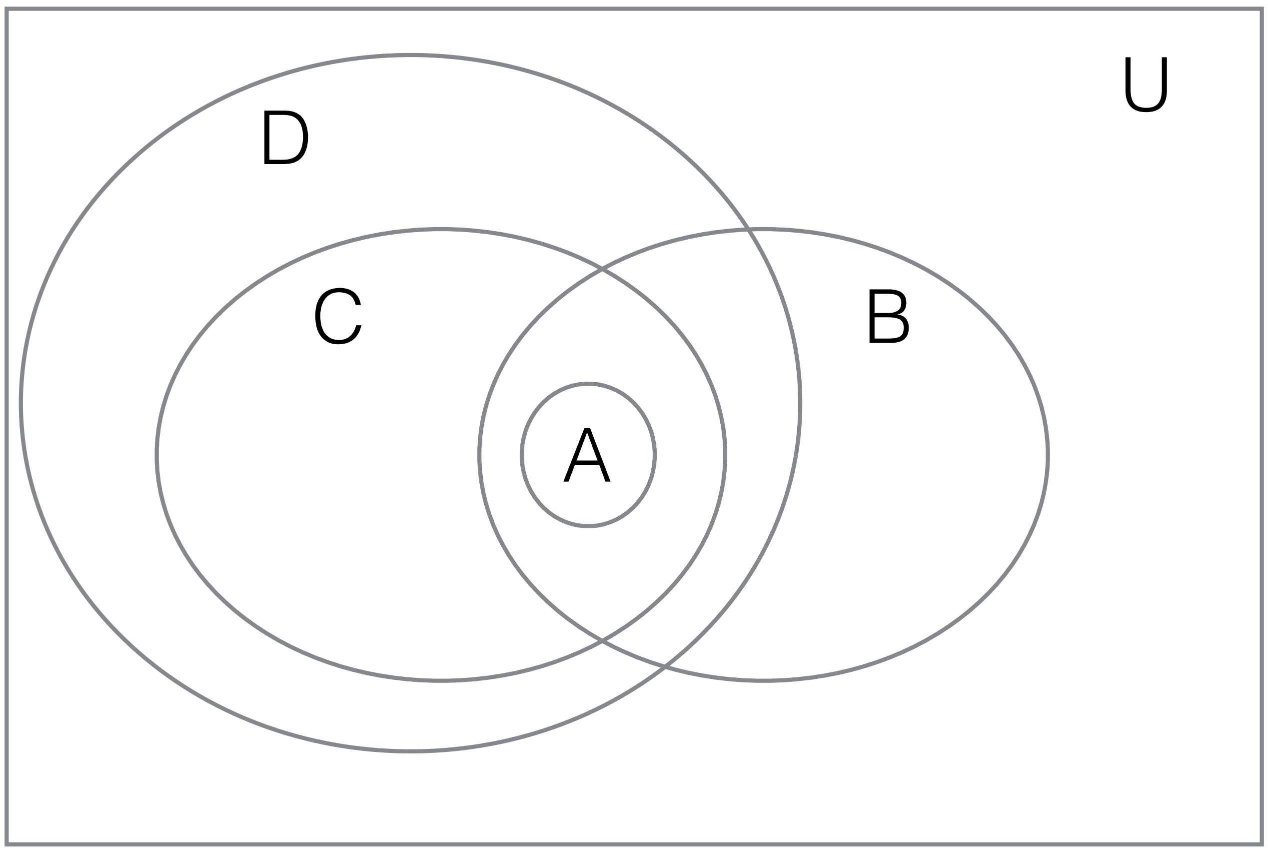
Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.



Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.



Use a Venn diagram to illustrate the relationships $A \subset B$, $A \subset C$, and $C \subset D$.



What is the power set of the set $S = \{0, 1, 2\}$?

What is the power set of the set S = {0, 1, 2}?

$P(\{0, 1, 2\}) = \{\varnothing, \{0\}, \{1\}, \{2\}, \{0, 1\}, \{0, 2\}, \{1, 2\}, \{0, 1, 2\}\}$

$|P(S)| = 2^{|S|} = 2^3 = 8$

What is the power set of the set $S = \varnothing$?

What is the power set of the set S = ∅?

$P(\varnothing) = \{\varnothing\}$

$|P(S)| = 2^{|S|} = 2^0 = 1$

What is the power set of the set $S = \{\varnothing\}$?

What is the power set of the set S = {∅}?

$P(\{\varnothing\}) = \{\varnothing, \{\varnothing\}\}$

$|P(S)| = 2^{|S|} = 2^1 = 2$

What is the cartesian product of $A \times B$, where $A = \{0,1\}$ and $B = \{0,1\}$?

What is the cartesian product of $A \times B$, where $A = \{0,1\}$ and $B = \{0,1\}$?

$A \times B = \{ (0,0), (0,1), (1,0), (1,1) \}$

What is the cartesian product of $A \times B$, where $A = \{A, K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3, 2\}$ and $B = \{♠, ♥, ♦, ♣\}$?

What is the cartesian product of $A \times B$, where $A = \{A, K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3, 2\}$ and $B = \{♠, ♥, ♦, ♣\}$?

{(A, ♠), (A, ♥), (A, ♦), (A, ♣),
(K, ♠), (K, ♥), (K, ♦), (K, ♣),

....

....

(3, ♠), (3, ♥), (3, ♦), (3, ♣),
(2, ♠), (2, ♥), (2, ♦), (2, ♣)}

All 52 cards in a deck by (rank, suit)!

What is the cartesian product of $A \times B \times C$, where $A=\{a\}$, $B=\{1,2\}$, $C=\{\spadesuit, \heartsuit\}$?

What is the cartesian product of $A \times B \times C$, where $A=\{a\}$, $B=\{1,2\}$, $C=\{♠, ♥\}$?

$A \times B \times C = \{(a,1,♠), (a,1,♥), (a,2,♠), (a,2,♥)\}$

Translate into English

- $\forall x \in \mathrm{R}\ (x^2 \neq -1)$
- $\exists x \in \mathrm{Z}\ (x^2 = 2)$
- $\forall x \in \mathrm{Z}\ (x^2 > 0)$
- $\exists x \in \mathrm{R}\ (x^2 = x)$

Translate into English

- $\forall x \in \mathbf{R}\ (x^2 \neq -1)$
  - The square of a real number is never -1. (True)
- $\exists x \in \mathbf{Z}\ (x^2 = 2)$
- $\forall x \in \mathbf{Z}\ (x^2 > 0)$
- $\exists x \in \mathbf{R}\ (x^2 = x)$

Translate into English

- $\forall x \in \mathbf{R}\ (x^2 \neq -1)$
  - The square of a real number is never -1. (True)
- $\exists x \in \mathbf{Z}\ (x^2 = 2)$
  - There exists an integer whose square is 2. (False)
- $\forall x \in \mathbf{Z}\ (x^2 > 0)$
- $\exists x \in \mathbf{R}\ (x^2 = x)$

Translate into English

- $\forall x \in \mathbf{R}\ (x^2 \neq -1)$
  - The square of a real number is never -1. (True)
- $\exists x \in \mathbf{Z}\ (x^2 = 2)$
  - There exists an integer whose square is 2. (False)
- $\forall x \in \mathbf{Z}\ (x^2 > 0)$
  - The square of every integer is positive. (False. 0)
- $\exists x \in \mathbf{R}\ (x^2 = x)$

Translate into English

- $\forall x \in \mathbf{R}\ (x^2 \neq -1)$
  - The square of a real number is never -1. (True)
- $\exists x \in \mathbf{Z}\ (x^2 = 2)$
  - There exists an integer whose square is 2. (False)
- $\forall x \in \mathbf{Z}\ (x^2 > 0)$
  - The square of every integer is positive. (False. 0)
- $\exists x \in \mathbf{R}\ (x^2 = x)$
  - There is a real number equal to its square. (True. 1)