

Exercise 1

1. Let A, B and C be three parts of a set E. Give a simplified writing of the following subsets:

$$[A \cup (A \cap B)] \cap B$$

$$(A \cap B) \cup (A \cap B^c)$$

2. What is the power set of $E = \{a, b, c, d\}$?
3. Prove that:

$$(A \cap B) = (A \cup B) \Rightarrow A = B$$

4. Let A, B be two parts of a set E. We note C_E^A as the complement of A in E. What is the correct answer?

$\overline{A \cup B} = \bar{A} \cup \bar{B}$

$\overline{A \cup B} = \bar{A} \cap \bar{B}$

$\overline{A \cup B} = A \cap B$

Exercise 2

We define the relation R:

$$xRy \Leftrightarrow \cos^2 + \sin^2 = 1$$

1. show that **R** is equivalence relation.
2. give the equivalence class of 0.
3. Let E and F be two non-empty sets and f be a map from E to F. Let A, B be two subsets of E. What are the correct answers?

$A \subset B \Rightarrow f^{-1}(A) \subset f^{-1}(B)$

$f^{-1}(A \cap B) = f^{-1}(A) \cap f^{-1}(B)$

$f^{-1}(A \cap B) \subset f^{-1}(A) \cap f^{-1}(B)$

$f^{-1}(A \cup B) = f^{-1}(A) \cap f^{-1}(B)$