

Esercizio 1 Tavole di verità

• $(A \rightarrow A) \rightarrow A$

| A | $A \rightarrow A$ | $(A \rightarrow A) \rightarrow A$ |
|---|-------------------|-----------------------------------|
| V | V | V |
| F | V | F |

• $A \rightarrow (A \rightarrow A)$

| A | $A \rightarrow A$ | $A \rightarrow (A \rightarrow A)$ |
|---|-------------------|-----------------------------------|
| V | V | V |
| F | V | V |

• $A \vee B \rightarrow A \wedge B$

| A | B | $A \vee B$ | $A \wedge B$ | $A \vee B \rightarrow A \wedge B$ |
|---|---|------------|--------------|-----------------------------------|
| V | V | V | V | V |
| V | F | V | F | F |
| F | V | V | F | F |
| F | F | F | F | V |

• $(A \vee B) \wedge C \rightarrow A \wedge (C \vee D)$

| A | B | C | D | $A \vee B$ | $(A \vee B) \wedge C$ | $C \vee D$ | $A \wedge (C \vee D)$ | P |
|---|---|---|---|------------|-----------------------|------------|-----------------------|---|
| V | V | V | V | V | V | V | V | V |
| V | V | V | F | V | V | V | V | V |
| V | V | F | V | V | F | V | V | V |
| V | V | F | F | V | F | F | F | V |
| V | F | V | V | V | V | V | V | V |
| V | F | V | F | V | V | V | V | V |
| V | F | F | V | V | F | V | V | V |
| V | F | F | F | V | F | F | F | V |
| F | V | V | V | V | V | V | F | F |
| F | V | V | F | V | V | V | F | F |
| F | V | F | V | V | F | V | F | V |
| F | V | F | F | V | F | F | F | V |
| F | F | V | V | F | F | V | F | V |
| F | F | V | F | F | F | V | F | V |
| F | F | F | V | F | F | V | F | V |
| F | F | F | F | F | F | F | F | V |

• $A \rightarrow (B \rightarrow A)$

| A | B | $B \rightarrow A$ | $A \rightarrow (B \rightarrow A)$ |
|---|---|-------------------|-----------------------------------|
| V | V | V | V |
| V | F | V | V |
| F | V | F | V |
| F | F | V | V |

Esercizio 2

• $\neg (A \leftrightarrow C) \vee A$

| A | C | $A \leftrightarrow C$ | $\neg (A \leftrightarrow C)$ | $\neg (A \leftrightarrow C) \vee A$ |
|---|---|-----------------------|------------------------------|-------------------------------------|
| V | V | V | F | V |
| V | F | F | V | V |
| F | V | F | V | V |
| F | F | V | F | F |

• $C \rightarrow (\neg A \vee \neg C)$

| A | C | $\neg A$ | $\neg C$ | $\neg A \vee \neg C$ | $C \rightarrow (\neg A \vee \neg C)$ |
|---|---|----------|----------|----------------------|--------------------------------------|
| V | V | F | F | F | F |
| V | F | F | V | V | V |
| F | V | V | F | V | V |
| F | F | V | V | V | V |

$$\bullet (A \vee \underbrace{\neg(B \rightarrow C)}_P) \wedge (\neg C \vee B) = Q$$

| A | B | C | $B \rightarrow C$ | P | $A \vee P$ | $\neg C \vee B$ | Q |
|---|---|---|-------------------|-----|------------|-----------------|---|
| V | V | V | V | F | V | V | V |
| V | V | F | F | V | V | V | V |
| V | F | V | V | F | V | F | F |
| V | F | F | V | F | V | V | V |
| F | V | V | V | F | F | V | F |
| F | V | F | F | V | V | V | V |
| F | F | V | V | F | F | F | F |
| F | F | F | V | F | F | V | F |

$$\bullet A \wedge \neg(\underbrace{A \rightarrow \neg(\neg A \vee A)}_P)$$

| A | $\neg A$ | $\neg A \vee A$ | $\neg(\neg A \vee A)$ | P | $\neg P$ | $A \wedge \neg P$ |
|---|----------|-----------------|-----------------------|-----|----------|-------------------|
| V | F | V | F | F | V | V |
| F | V | V | F | V | F | F |

- $(A \wedge B) \wedge (A \vee B) \wedge (A \rightarrow B)$

| A | B | $A \wedge B$ | $A \vee B$ | $A \rightarrow B$ | $(A \wedge B) \wedge (A \vee B) \wedge (A \rightarrow B)$ |
|---|---|--------------|------------|-------------------|-----------------------------------------------------------|
| V | V | V | V | V | V |
| V | F | F | V | F | F |
| F | V | F | V | V | F |
| F | F | F | F | V | F |

Esercizio 3

Dimostrare la validità

- $A \rightarrow A$ (identità)

| A | $A \rightarrow A$ |
|---|-------------------|
| V | V |
| F | V |

OK

- $A \rightarrow \neg\neg A$ (doppia negazione)

| A | $\neg A$ | $\neg\neg A$ |
|---|----------|--------------|
| V | F | V |
| F | V | F |

- $A \wedge B \leftrightarrow B \wedge A$

| A | B | $A \wedge B$ | $B \wedge A$ | $A \wedge B \leftrightarrow B \wedge A$ |
|---|---|--------------|--------------|-----------------------------------------|
| V | V | V | V | V |
| V | F | F | F | V |
| F | V | F | F | V |
| F | F | F | F | V |

OK

BASTA

SONO TUTTI UGUALI