1. $\neg P \leftrightarrow P \downarrow P$

$P \wedge Q \leftrightarrow (P \downarrow P) \downarrow (Q \downarrow Q)$ $\quad P \vee Q \leftrightarrow (P \downarrow Q) \downarrow (P \downarrow Q)$

$(P \to Q) \leftrightarrow ((P \downarrow P) \downarrow Q) \downarrow ((P \downarrow P) \downarrow Q)$

$(P \leftrightarrow Q) \leftrightarrow \big((P \downarrow P) \downarrow (Q \downarrow Q)\big) \vee \big(((P \downarrow P) \downarrow (P \downarrow P)) \downarrow ((Q \downarrow Q) \downarrow (Q \downarrow Q))\big)$

$\leftrightarrow \Big(\big(((P \downarrow P) \downarrow (Q \downarrow Q)) \downarrow \big((P \downarrow P) \downarrow (Q \downarrow Q)\big) \downarrow \big((Q \downarrow Q) \downarrow (Q \downarrow Q)\big)\big) \downarrow$

$\Big(\big(((P \downarrow P) \downarrow (Q \downarrow Q)) \downarrow \big((P \downarrow P) \downarrow (Q \downarrow Q)\big) \downarrow \big((Q \downarrow Q) \downarrow (Q \downarrow Q)\big)\big)\Big)$

2. ① $\neg\neg A \leftrightarrow A$

(1) A 假设
(2) $\neg A$ 假设
(3) $\neg\neg A$ (1)(2)(3) $\neg -$
(4) $A \to \neg\neg A$ (1)(3) $\to +$

(5) $\neg\neg A$ 假设
(6) $\neg A$ 假设
(7) A (5)(6)(7) $\neg -$
(8) $\neg\neg A \to A$ (5)(8) $\to +$
(9) $A \leftrightarrow \neg\neg A$ (4)(9) $\leftrightarrow +$

② $(A \wedge B \to C) \to ((\neg C \wedge A) \to \neg B)$

(1) $A \wedge B \to C$ 假设
(2) $\neg C \wedge A$ 假设
(3) $\neg C$ (2) $\wedge -$
(4) A (2) $\wedge -$
(5) B 假设

(6) | | | $A \wedge B$ (4)(5) $\wedge_+$

(7) | | | C (6)(1) $\rightarrow_-$

(8) | | | $\neg B$ (5)(8) $\neg_+$

(9) | | $(\neg C \wedge A) \rightarrow \neg B$ (2)(8) $\rightarrow_+$

(10) | $(A \wedge B \rightarrow C) \rightarrow ((\neg C \wedge A) \rightarrow \neg B)$ (1)(9) $\rightarrow_+$

3. ①

(1) $A \wedge (B \rightarrow C)$ 前提

(2) $\neg (C \wedge A)$ 前提

(3) ○ B 假设

(4) | A (1) $\wedge_-$

(5) | $B \rightarrow C$ (1) $\wedge_-$

(6) | C (3)(5) $\rightarrow_-$

(7) | $C \wedge A$ (4)(6) $\wedge_+$

(8) | $\neg B$ (2)(7) $\neg_+$ $C \rightarrow (D \rightarrow E)$.

②

(1) $A \vee (\neg B \vee \neg C)$

(2) $A \rightarrow (D \rightarrow E)$

(3) $\neg (\neg B \vee \neg D)$

(4) ○ C 假设

(5) | ○ $\neg B \vee \neg C$ 假设

(6) | | $B \wedge D$ (3) P^N

(7) | | B (6) $\wedge_-$

(8) | | ¬C (7) DR4

(9) | | ¬(¬B V ¬C) (4)(8) DR4

(10) | A

(10)(1) DR4

(11) | D → E (2) →₋

(12) | C → (D → E) (4)(11) →₊

Border

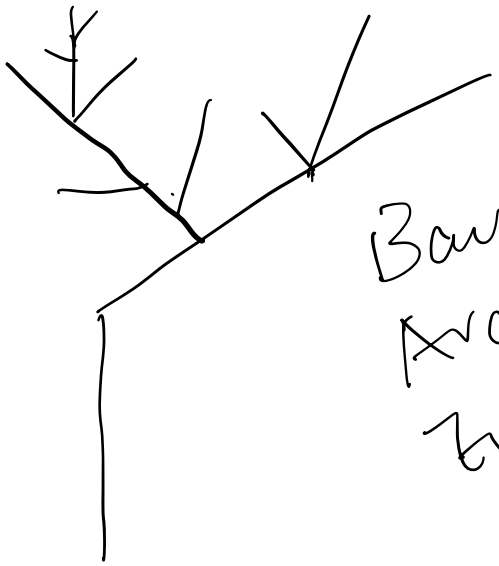
Scienc - Logics, Science
Calculation

Sports - Different Systemization
↓
Coherent to Society?

Demarcation Problem

Certainty

Bio ⟷ EE



Bacteria
Archaea
Eukarya

Dangerous
Common
Senses

Good vs. Harmful Scienc

NOT STAMPED

Critique General determinism.

Industrialization