1 Assumptions

$$(a \to b) \to (\neg b \to \neg a) \tag{1}$$

Goal: **T**

2 Proof Steps

1. Material implication of 1

$$\neg (a \to b) \vee (\neg b \to \neg a) \tag{2}$$

2. Material implication at right of 2

$$\neg (a \to b) \vee (\neg (\neg b) \vee \neg a) \tag{3}$$

3. Material implication at left.operand of 3

$$\neg (\neg a \vee b) \vee (\neg (\neg b) \vee \neg a) \tag{4}$$

4. Demorgan or at left of 4

$$(\neg (\neg a) \wedge \neg b) \vee (\neg (\neg b) \vee \neg a) \tag{5}$$

5. Negation at left.left of 5

$$(a \wedge \neg b) \vee (\neg (\neg b) \vee \neg a) \tag{6}$$

6. Negation at right.left of 6

$$(a \wedge \neg b) \vee (b \vee \neg a) \tag{7}$$

7. Commutative or of 7

$$(b \vee \neg a) \vee (a \wedge \neg b) \tag{8}$$

8. Associative or of 8

$$b \vee (\neg a \vee (a \wedge \neg b)) \tag{9}$$

9. Distributive or at right of 9

$$b \vee ((\neg a \vee a) \wedge (\neg a \vee \neg b)) \tag{10}$$

10. Commutative or at right.left of 10

$$b \vee ((a \vee \neg a) \wedge (\neg a \vee \neg b)) \tag{11}$$

11. Excluded middle at right.left of 11

$$b \vee ((\mathbf{T}) \wedge (\neg a \vee \neg b)) \tag{12}$$

12. Commutative and at right of 12

$$b \vee ((\neg a \vee \neg b) \wedge (\mathbf{T})) \tag{13}$$

13. Identity and at right of 13

$$b \vee (\neg a \vee \neg b) \tag{14}$$

14. Commutative or of 14

$$(\neg a \vee \neg b) \vee b \tag{15}$$

15. Associative or of 15

$$\neg a \vee (\neg b \vee b) \tag{16}$$

16. Commutative or at right of 16

$$\neg a \vee (b \vee \neg b) \tag{17}$$

17. Excluded middle at right of 17

$$\neg a \vee (\mathbf{T}) \tag{18}$$

18. Domination or of 18

$$\mathbf{T} \tag{19}$$

QED