# Introduction to Logical Reasoning

## Workshop # 6: Assessing Arguments with Truth Tables (Solutions)

**Part I:** Each of the following problems presents an argument. For each, use the truth table method from class (or the textbook) to determine whether it is a valid or invalid argument. Be sure to briefly explain how the truth table supports your answer concerning the validity of the argument.

1. 1. $p \rightarrow (q \,\&\, r)$.
   2. $\sim p$.
   ∴ $\sim r$.

| | | | | P1 | P2 | C |
|---|---|---|---|---|---|---|
| $p$ | $q$ | $r$ | $q \,\&\, r$ | $p \rightarrow (q \,\&\, r)$ | $\sim p$ | $\sim r$ |
| T | T | T | T | T | F | F |
| T | T | F | F | F | F | T |
| T | F | T | F | F | F | F |
| T | F | F | F | F | F | T |
| F | T | T | T | T | T | F |
| F | T | F | F | T | T | T |
| F | F | T | F | T | T | F |
| F | F | F | F | T | T | T |

The argument is *invalid* [2]. The premises are **true** in lines 5 and 7 [2], but the conclusion is **false** in these lines [2].

Table filled in correctly [32]. Marked the premise and conclusion columns [1]. Circled the rows with all true premises [4] and circled the conclusion's truth value in those rows [4]. Following directions [1]. No other mistakes [1].

2. 1. $p \vee q$.
   2. $\sim p$.
   ∴ $q$.

| | C | P1 | P2 |
|---|---|---|---|
| $p$ | $q$ | $p \vee q$ | $\sim p$ |
| T | T | T | F |
| T | F | T | F |
| F | T | T | T |
| F | F | F | T |

The argument is *valid* [2]. The premises are **true** in line 3 [2] and the conclusion is also **true** in that line [2].

Correctly set up top row [4] and initial columns [2]. Remaining table filled in correctly [4]. Marked the premise and conclusion columns [1]. Circled the row with all true premises [1] and circled the conclusion's truth value in that row [1]. Following directions [1]. No other mistakes [1].

3. 1. $p \rightarrow q$.
   2. $q \rightarrow r$.
   ∴ $p \rightarrow r$.

| | | | P1 | P2 | C |
|---|---|---|---|---|---|
| $p$ | $q$ | $r$ | $p \rightarrow q$ | $q \rightarrow r$ | $p \rightarrow r$ |
| T | T | T | T | T | T |
| T | T | F | T | F | F |
| T | F | T | F | T | T |
| T | F | F | F | T | F |
| F | T | T | T | T | T |
| F | T | F | T | F | T |
| F | F | T | T | T | T |
| F | F | F | T | T | T |

The argument is *valid* [2]. The premises are **true** in lines 1, 5, 7, and 8 [2] and the conclusion is also **true** in those lines [2].

Correctly set up top row [6] and initial columns [3]. Remaining table filled in correctly [12]. Marked the premise and conclusion columns [1]. Circled the rows with all true premises [4] and circled the conclusion's truth value in those rows [4]. Following directions [1]. No other mistakes [1].

*Please continue* ▶

# Workshop # 6: Assessing Arguments with Truth Tables (Solutions)

**Part II:** Each of the following problems presents an argument in English. For each, (1) translate it into the language of symbolic logic, using the indicated capital letters to label each simple positive statement involved, (2) put it into argumentative form, and (3) use the truth table method from class (or the textbook) to determine whether the argument is valid or invalid. Be sure to briefly explain how the truth table supports your answer concerning the validity of the argument.

1. Either the Internet is **killing** journalism or journalists are **adapting**. Well, the audience of news consumers not **widening** is a necessary condition of the internet **killing** journalism. But the audience of news consumers is **widening**! Therefore, journalists are **adapting**. (K, A, W)

1. $K \vee A$. [2]
2. $K \rightarrow \sim W$. [2]
3. $W$. [2]

$\therefore$ $A$. [2]

| | C | $P_3$ | | $P_1$ | $P_2$ |
|---|---|---|---|---|---|
| K | A | W | ~W | K ∨ A | K → ~W |
| T | T | T | F | T | F |
| T | T | F | T | T | T |
| T | F | T | F | T | F |
| T | F | F | T | T | T |
| F | **T** | T | F | T | T |
| F | T | F | T | T | T |
| F | F | T | F | F | T |
| F | F | F | T | F | T |

The argument is *valid* [2]. The premises are **true** in line 4 [2] and the conclusion is also **true** in that line [2].

Correctly set up top row [6] and initial columns [3]. Remaining table filled in correctly [12]. Marked the premise and conclusion columns [1]. Circled the row with all true premises [1] and circled the conclusion's truth value in that row [1]. Following directions [1]. No other mistakes [1].

2. Is the Internet is killing journalism? Well, the Internet has **widened** the audience of news consumers and it has put more news at people's **fingertips**, and both these things are sufficient for the Internet to not be **killing** journalism. So, the Internet is not **killing** journalism. (W, F, K)

1. $(W \,\&\, F) \,\&\, [(W \,\&\, F) \rightarrow \sim K]$ [2]

$\therefore$ $\sim K$. [2]

| | | | | C | | $P_1$ |
|---|---|---|---|---|---|---|
| W | F | K | W & F | ~K | (W & F) → ~K | (W & F) & [(W & F) → ~K] |
| T | T | T | T | F | F | F |
| T | T | F | T | **T** | T | T |
| T | F | T | F | F | T | F |
| T | F | F | F | T | T | F |
| F | T | T | F | F | T | F |
| F | T | F | F | T | T | F |
| F | F | T | F | F | T | F |
| F | F | F | F | T | T | F |

The argument is *valid* [2]. The premise is **true** in line 2 [2] and the conclusion is also **true** in that line [2].

Correctly set up top row [7] and initial columns [3]. Remaining table filled in correctly [16]. Marked the premise and conclusion columns [1]. Circled the row with all true premises [1] and circled the conclusion's truth value in that row [1]. Following directions [1]. No other mistakes [1].