

Analyzing Arguments with Truth Tables

Contemporary Math (MAT-130)

Each argument is either valid by one of the forms of valid arguments discussed, or it is a fallacy by one of the forms of invalid arguments discussed. Decide whether each argument is valid or a fallacy, and give the form that applies.

1. If I get paid, then I will buy a new pair of shoes.
I did not buy a new pair of shoes.
I did not get paid.
2. I will go to the fair or I will go to the beach.
I did not go to the fair.
I went to the beach.
3. If it is raining, then I will take an umbrella.
I took an umbrella.
It was raining.
4. If I go to the mall, then I will buy a new shirt.
I went to the mall.
I bought a new shirt.
5. If it is broken, then I will fix it.
It is not broken.
I did not fix it.
6. If I go to the city, I will see a comedy show.
If I see a comedy show, I will laugh.
If I go to the city, I will laugh.
7. If it's an African swallow, then it can carry a coconut.
It can carry a coconut.
It is an African swallow.
8. If there is smoke, then there is fire.
There is smoke.
There is a fire.
9. It is a bird or it is a horse.
It is not a bird.
It is a horse.
10. If you go to the jungle, you will see a tiger.
You did not go to the jungle.
You did not see a tiger.
11. If you are 18, then you can vote.
You can't vote.
You are not 18.
12. If you drive drunk, you will be arrested.
If you get arrested you will go to jail.
If you drive drunk, you will go to jail.

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Use a truth table to determine whether the argument is valid or invalid.

13. $p \wedge q$

$$\frac{\sim p}{\sim q}$$

$$\sim q$$

14. $q \rightarrow \sim p$

$$\frac{p \wedge q}{p}$$

$$p$$

15. $p \vee q$

$$\frac{q \vee r}{p \vee r}$$

$$p \vee r$$

16. $p \rightarrow \sim q$

$$\frac{p \wedge q}{\sim p}$$

$$\sim p$$

17. $(p \wedge q) \rightarrow (\sim p \vee \sim q)$

$$\frac{p \rightarrow q}{\sim q}$$

$$\sim q$$

18. $(p \wedge q) \rightarrow \sim r$

$$\frac{q \rightarrow \sim r}{\sim p}$$

$$\sim p$$

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Solutions:

1. Valid, Modus Tollens
2. Valid, Disjunctive Syllogism
3. Invalid, Fallacy of the Converse
4. Valid, Modus Ponens
5. Invalid, Fallacy of the Inverse
6. Valid, Reasoning by Transitivity
7. Invalid, Fallacy of the Converse
8. Valid, Modus Ponens
9. Valid, Disjunctive Syllogism
10. Invalid, Fallacy of the Inverse
11. Valid, Modus Tollens
12. Valid, Reasoning by Transitivity
13. Valid, Tautology
14. Valid, Tautology
15. Invalid, TTTTFTT
16. Valid, Tautology
17. Invalid, TTFT
18. Invalid, TTFTTFT