

2.3 - Deductive Reasoning

- 1) In your own words, what is the difference between inductive reasoning and deductive reasoning?

*Inductive - Finding a pattern to draw a conclusion.
Deductive - Using previous knowledge to draw a conclusion.*

Make a valid conclusion in the situation.

- 2) If the measure of an angle is 90° , then it is a right angle. The measure of $\angle A$ is indeed 90° .

$\therefore \angle A$ is a right angle

- 3) If $x > 12$, then $-x < -12$. The value of x is 15.

$\therefore -15 < -12$

In #4 -#12, determine the logical conclusion and state which law you used: Law of Detachment (LOD), Law of Contrapositive (LOC), or Law of Syllogism (LOS). If no conclusion can be drawn, write "no conclusion."

- 4) People who vote for Jane Wannabe are smart people. I voted for Jane Wannabe.

\therefore I'm a smart person

LOD

- 5) If Rae is the driver today then Maria is the driver tomorrow. Ann is the driver today.

No conclusion

- 6) If a shape ^a is a circle, then it never ends. If it never ends, ^b then it never starts. If it never starts, ^c then it doesn't exist. If it doesn't exist, ^d then we don't need to study it. ^e

If a shape is a circle, then we don't need to study it. LOS

- 7) If you text while driving, then you are unsafe. You are a safe driver.

\therefore You do not text while driving

LOC

8) If you wear sunglasses, then it is sunny outside. You are wearing sunglasses.

\therefore It is sunny outside. LOD

9) If you wear sunglasses, then it is sunny outside. It is cloudy.

\therefore You don't wear sunglasses. LOC

10) I will clean my room if my mom asks me to. I am not cleaning my room.

\therefore My mom did ^{not ask} ~~ask~~ me to. LOC

11) If a rectangle has four equal side lengths, then it is a square. If a polygon is a square, then it is a regular polygon.

If a rectangle has four equal side lengths, then it is a regular polygon. LOS

12) If $y > 0$, then $2y > 0$. If $2y > 0$, then $2y - 5 \neq -5$

If $y > 0$, then $2y - 5 \neq -5$
LOS

In #13-17, decide whether inductive or deductive reasoning is used to reach the conclusion. Briefly explain why.

13) The rule at your school is that you must attend all of your classes in order to participate in in-school sports after school. You played in a soccer game after school on Monday. Therefore, you went to all of your classes on Monday.

Deductive. Previous knowledge of rule.

14) For the past 5 years, your neighbor goes on vacation every July 4th and asks you to feed her hamster. You conclude that you will be asked to feed her hamster on the next July 4th.

Inductive. Following pattern of being asked.

- 15) John is watching the weather. As the day goes on, it gets more and more cloudy and cold. He concludes that it is going to rain.

Deductive. Previous knowledge if it gets cloudy and cold that it may rain.

- 16) Beth's 2-year-old sister only eats hot dogs, blueberries and yogurt. Beth decides to give her sister some yogurt because she is hungry.

Deductive. Previous knowledge of what sister only eats.

- 17) Nolan Ryan has the most strikeouts of any pitcher in Major League Baseball. Jeff debates that he is the best pitcher of all-time for this reason.

Deductive. Previous knowledge of Nolan Ryan having the most strikeouts.

In #18 & 19, write a truth table for the following variables.

- 18) $p \vee \sim q$

p	q	$\sim q$	$p \vee \sim q$
T	T	F	T
T	F	T	T
F	T	F	F
F	F	T	T

- 19) $\sim p \wedge \sim q$

p	q	$\sim p$	$\sim q$	$\sim p \wedge \sim q$
T	T	F	F	F
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T