**Final notes about critical thinking skills**

1. For a brief introduction of arguments, what amounts to a good argument, and two different kinds of arguments, i.e.deductive and inductive arguments, go to <https://criticalthinkeracademy.com/courses/what-is-a-good-argument/lectures>

The lecture at the site that summarizes what counts as a good argument is particularly useful at the conclusion of the topic “What is a good argument”, or “What is a **sound** argument” actually, considering the word “sound” is used in the test scheduled for week 10. You can find the the script of the lecture in this package, too.

2. Valid, Strong, Weak arguments

• VALID: If all the premises are true, the conclusion follows with certainty.

• STRONG: If all the premises are true, the conclusion follows with high probability.

• WEAK: If all the premises are true, the conclusion follows neither with certainty nor with high probability.

3. Deductive/Inductive Arguments

-Deductive arguments are made when arguers intend to make a **valid** argument.

-Deductive arguments can be divided into valid and invalid arguments.

-Inductive argumemts are made when arguers intend to make their argument **strong, not valid**.

-Inductive arguments can be divided into strong (i.e.inductively forceful) arguments and weak (i.e. not inductively forceful) arguments

3. Inductive arguments & Induction in scientific reasoning

- In standard logic, inductive arguments are intended to be strong in reasoning with a conclusion highly probable to be true.

- In science, induction is defines as reasoning from the particular to the general. Since such inductive arguments also intend to present a conclusion that is very likely to be true, they are a part of the inductive arguments in its broader sense.

Notes:

1. Inferences from correlations to causes, or predictions of future events based on past events are inductive reasoning

2. Scientific **theories** are the result of inductive reasoning, which means the conclusion it draws can not be absolutely true - they might change as new evidence appears.

3. Valid arguments and valid inferences are typically used “in fields like mathematics, computer science and formal deductive logic. The natural and social sciences, on the other hand, deal with fallible, risky inferences. They aim for strong arguments.”

2. Non-arguments: (***see another Word doc for details***)

The follows types of statements are **not** arguments:

-descriptions

-summaries

-explanations/elaboration

- introductions

-background information

-other extraneous materials.

For example, passage 1 has nothing but a statement at the beginning about how “animals” “are treated” in labs and an explanation of it in the rest of the passage. Passage 2, however, presents an argument with good reasons to support the claim made at the beginning.

*Passage 1*

The animals used in laboratory research are treated in a scandalously abusive fashion. In their pursuit of cures for human diseases, scientists do not seem to care how they treat their animal subjects. Considered inferior beings, animals can be tortured, starved, even killed, and no one cares. After all, the mistreatment is done in the name of medical progress for human beings. Because animals have no language to voice their pain, we ignore it and let their suffering continue.

*Passage 2*

The 1979 book Nim, written by the psychologist Herbert Terrace, should be required reading for all those people who are convinced that chimpanzees can use sign language to "talk." It should be required because it places in serious doubt the notion that animals can "talk" like human beings. After four years of teaching Nim, a baby male chimp named for the linguist Noarit-Chomsky, Terrace wrote an account of his experiments, and that account does not support popular claims for animal language. As Terrace points out in the book, Nim, by himself, seldom used any sign language at all. Instead, he confined himself to responding to his trainers. Fifty percent of the time his signs imitated part or all of his trainer's original signs. In addition, whenever he began to string together two or three words, he would become confused. He never developed the ability to construct sentences.

The difference between **explanations** and **arguments**: In the case of an explanation we take a single statement and look for reasons why it is true and, in the case of an argument, on the basis of one or several statements (the premises) we infer another statement (the conclusion).

3. Facts vs Opinions

3.1 Definitions

A fact is a statement that can be proven by some reliable authority such as a proven scientific law, a governmental law, a history book, mathematics, measurements, observations, statistics, etc.

An opinion is often the view of an individual or group on a topic that is grounded in fact or completely unsupportable.

In informal situations it often comes from one's own personal feelings, current beliefs and values, or what one has been taught and one’s own past experience, rather than facts.

An opinion may be a fully presented argument in formal discussions such as those found in the “Opinion” column of newspapers and magzines.

3.2 Confusing cases in distinguishing the two:

1) Mixture of facts and opinions

*Examples:*

a. The office building was fumigated on August 23, 2014, and that’s why Maria got cancer.

b. Amelia bought bread and milk at the corner store on Saturday because she is too lazy to go to the mega mart.

c. My 83-year-old mother had a fever of 103 degrees on Wednesday evening, and my sister just didn’t care.

2) Opinion presented looking like fact

*Example*: But one thing they’ll always have: our love and devotion.

*Analysis:* On the face, it is a statement of fact, but actually it is only a promise something yet to be realized in the future, so it is opinion

3) Confident assertions

*Example*: the solution is…,

it's my fault,

frankly,

*Analysis:* Assertions with such expressions sound like proven fact but may actually be opinions.

4) Statements strongly accepted or agreed to by people in general including the reader/listener

*Example: Exercise can result in iron loss.*

*Analysis:* This is an opinion because the writer's attitude towards the matter is talked about.

can: *suggesting theoretical possibility*

*Theoretically exercise may result in iron loss.*

5) Statements of evaluations, attitudes and probabilities

*Example:* Not enough people care about global warming *.*

*Analysis: “*Not enough” is not an idea that can be evaluated.

Not enough: vague idea

*Other examples*: Statements with such expressions as

I believe . . .

I think, or I thought . . .

It is thought that . . .

Those people always . . .

It’s a sad day when . . .

... Probably/perhaps/possible/likely/unlikely...

6) Statements about future events even if they seem certain

*Example:* Eventually consumption of fossil fuel will be strictly regulated in China.

*Analysis:* Perhaps one day this will come to pass, but perhaps it won't. Either way this is an opinion.

7). Some facts change over time !

Example:

It was once considered to be a fact that the world was flat.

(We believed that those traveling too far in either direction could literally fall off!)

4. Notes for the upcoming test：

**4.1 Questions asked in test:**

**Part I Vocabulary (10Points)**

**Replace the underlined words with the words below. (10 points)**

a. ambivalent b. sanity c. provoke d. arrogant e. compelling

f. erode g. lethal h. immovable i. intrigue g. committed

1. If the headline is not fascinating, it will not capture readers’ attention.

2. It’s time to move on in a relationship if you decide to keep loyal to your partner for the rest of your life.

**PartII Critical Thinking Skills (70 points)**

**1. Read and decide which is the best answer. (6 小题. 6 points)**

1) China is a developing country.

A．fact B opinion C mixture

2) The waiters at that restaurant are rude, and the food costs twice as much as its worth.

A. Fact B. Opinion C mixture

……

**2. For the following paragraphs, choose "yes" if it is an argument, "no" if it is not. (5小题 10 points)**

1) Sheep are the dumbest animals. If the one in front walks off a cliff, all the rest will follow it. And if they get rolled over on their backs, they can't right themselves.

2) ……

**3. Identifying Inductive and deductive arguments (5 小题，3 道单选两道多选 12 points)**

**1) Which of the following statements are correct? (单选)**

A. For deductive arguments, if the premise is true, the thesis is very likely to be true.

B. Both reasoning by principle and reasoning by definition are deductive reasoning.

C. Inductive arguments are weak.

D. Deductive arguments help us learn unknown things.

**2) Which of the following are deductive arguments？(多选)**

A. All dogs are mammals. All mammals have kidneys. Therefore all dogs have kidneys.

B. Since all squares are rectangles, and all rectangles have four sides, all squares have four sides.

C. All science teachers are smart, since all my physics teachers, chemistry teachers and biology teachers are smart.

D. The sun is a star; the sun has planets; therefore some stars have planets.

**3) Which of the following are inductive arguments?** **(多选)**

**……**

**4）Which logic, inductive or deductive logic, is used …. in the following conversation？ \_\_\_\_\_\_\_\_\_\_\_\_\_**

**……**

**5）Which of the following arguments contain a thesis that is absolutely true?**

A. I took a tiny bite of the bread, and it is too salty. The whole loaf of bread must be salty.

B. When there is south wind, often there will be rain. Now we have the south wind, there will be rain.

C. Alexander will finish his book by tomorrow afternoon as long as he is an accomplished speed reader. Fortunately for him, he is quite accomplished at speed reading. Therefore, he will get his book finished by tomorrow.

D.I don’t like Lily. Others don’t like her either….

**4. For the following 7 arguments, please choose the best answer for each question. (42 points)**

For question 1: A. deductive. B. inductive

For question2: A. valid B. invalid

C. inductively forceful D. not inductively forceful

For question 3: A. sound B. unsound C. undecided

1) Dr. E is a philosophy professor. All philosophy professors are bald. So Dr. E is bald.

问题 1:\_\_\_\_\_\_\_\_\_ 问题 2：\_\_\_\_\_\_\_\_\_ 问题 3: \_\_\_\_\_\_\_\_\_

2) Maria's hair is naturally black. Today Maria's hair is red. So Maria dyed her hair.

问题 1：\_\_\_\_\_\_\_\_\_问题 2：\_\_\_\_\_\_\_\_\_ 问题 3:\_\_\_\_\_\_\_\_\_

4.2 Clarification of the terms used in part 4 of PartII of our test: 【Super important !!!】

* + Regarding question 2, **“Inductively forceful” arguments and ”not inductively forceful” arguments** are equivalent to “**strong arguments**” and ”**weak arguments**” in the lectures we used from the Internet
  + Regarding question 3:

**“Sound”** is equivalent to “**good**” in our discussion of “**a good argument**” as defined by the “What is good argument?” part of the online lectures we used.

In other words, a sound argument has premises that are true in reality and are good reasons for accepting the conclusion, **whether it is deductive or inductive.**

**Therefore, typically a sound argument is a valid deductive argument or an inductively strong or forceful argument if the premises are actually, not hypothetically, true – although invalid deductive arguments may be sound arguments, too.**

“**Unsound**”, in contrast, refers to the **actual real-world falsity of the premises of** an argument or the **bad logic** between the premises and the conclusion.

**Therefore, unsound arguments may be valid or invalid deductive arguments, or inductively strong or weak arguments.**

“**Undecided**” is used where you can’t tell if the premises are true or not in reality in answering this part of the test.