

**Note:** Due to a counting error, the exercise set numbering jumps from 13 (in Chapter 1) to 16 here.

### **Exercise Set 16**

The best way to organize arguments, as we've already begun to see, is by attempting to form a "chain" of reasons, with each premise acting as a "link" to the next. Students should find these exercises easy to organize; by identifying the "linking" term, they can put the arguments in order.

**1. Instructions:** Organize the following arguments so that each premise follows from the one before it (hint: work backward from the conclusion!).

a. Elephants must have good memories, since all creatures with good memories have big ears, and elephants have big ears.

**Premise 1:** All creatures with good memories have big ears.

**Premise 2:** Elephants have big ears.

**Conclusion:** So, elephants have good memories.

b. If San Francisco is south of Seattle, then Seattle is south of Victoria. If Seattle is south of Victoria, then Victoria is in Canada. So, if San Francisco is south of Seattle, then Victoria is in Canada.

**Premise 1:** If San Francisco is south of Seattle, then Seattle is south of Victoria.

**Premise 2:** If Seattle is south of Victoria, then Victoria is in Canada.

**Premise 3:** So, if San Francisco is south of Seattle, then Victoria is in Canada.

c. All rascallions are scallywags, and all scallywags are mischievous. Therefore, all rascallions are mischievous.

**Premise 1:** All rascallions are scallywags.

**Premise 2:** All scallywags are mischievous.

**Premise 3:** Therefore, all rascallions are mischievous.

**2. Instructions:** Read the following argument. Next, write out each of the statements. After that, organize them according to premises and conclusion. Finally, put the premises in order:

People either they don't want to know anything, or they already know everything. Aristotle tells us that, "all men, by nature, desire to know." But there are lots of people who don't seem interested at all in learning new things. They just sit around watching television.

1. People either they don't want to know anything, or they already know everything.
2. Aristotle tells us that, "all men, by nature, desire to know."
3. But there are lots of people who don't seem interested at all in learning new things.
4. They just sit around watching television.

There are four statements, which means there are four premises and one conclusion. There are no indicator words, so it's not immediately clear what's going on. But let's look at how the statements are related. The first statement tells us that either people don't want to know anything, or they already know everything. You should find yourself asking *why?* The statement seems like a claim, which needs support. This, then, is a good candidate for the conclusion.

The statement about Aristotle can easily be checked out — he did indeed write what has been quoted here. As such it is an uncontroversial assertion, and so isn't the conclusion. What about the other two statements? Those appear to be premises, too, but related to each other, so maybe one is providing support for the other. The statement about people not being interested in new things seems to be a response to the statement about what Aristotle said. Lots of people watch television. That's a fact. It seems to lend support, by way of example, to the statement, "there are lots of people who don't seem interested in learning new things."

Premise 1: Aristotle tells us that, "all men, by nature, desire to know."

**Premise 2:** But there are lots of people who don't seem interested in learning new things.

**Premise 3:** They just sit around watching television.

**Conclusion:** People either they don't want to know anything, or they already know everything.

### **Exercise Set 17**

**Instructions:** Arrange the following arguments in standard form, i.e., some version of writing the premises above the conclusion, one over the other. Remember, your job does not involve evaluating the argument, only organizing it. Here is a sample:

Cats and dogs are animals. Since animals are mammals, it follows that cats and dogs are mammals.

Cats and dogs are animals.

Animals are mammals.

Cats and dogs are mammals

OR

Premise: Cats and dogs are animals.

Premise: Animals are mammals.

Conclusion: animals are mammals

1. My doctor told me I'm overweight, my blood pressure is high, and my "bad" cholesterol is high. He also told me that if I don't get in shape, he'll put me on medication. So, I should exercise and eat better.

**My doctor told me I'm overweight, my blood pressure is high, and my "bad" cholesterol is high.**

**My doctor also told me that if I don't get in shape, he'll put me on medication.**

**I should exercise and eat better.**

2. LuAnne isn't guilty of stealing your pearl necklace last night. She cut her finger while chopping onions yesterday afternoon and spent all night in the ER.

Besides, she's just not the sort of person who would steal from someone, let alone a friend.

**LuAnne cut her finger while chopping onions yesterday afternoon and spent all night in the ER.**

**LuAnne is just not the sort of person who would steal from someone, let alone a friend.**

**LuAnne isn't guilty of stealing your pearl necklace last night.**

3. Aquatic creatures live in water. Most creatures that live in water do not breathe air. So, trout and sharks do not breathe air.

**Aquatic creatures live in water.**

**Most creatures that live in water do not breathe air.**

**Trout and sharks do not breathe air.**

## **Exercise Set 18**

**Lots of non-arguments masquerade as arguments. A non-argument is often an explanation, exposition, example, comment, simple sentence, report, observation, and the like. Sometimes arguments are not complete, and we must fill in the implied conclusion or missing premises. This is most often the case during conversation. We operate in shorthand and do not complete our thinking process.**

**1. Instructions:** Circle all passages that are arguments from the choices below. Explain why the other passages are not arguments:

a. Roses are the most beautiful of all the flowers. They smell so good.

**Just because they smell good doesn't make them beautiful, or vice versa. Here, only an opinion is expressed.**

b. Many animals have long appendages. For example, camels and giraffes have long necks; elephants have long trunks; and lions and tigers have long tails.

**This is just an assertion of fact, and then examples of long appendages.**

c. Hippos spend much of their time in the water.

**This is an assertion fact that, if you didn't know it, could be confirmed by observation.**

d. Liesel, Hansel, or Gretel went to the witch's house. It wasn't Liesel, so it was Hansel or Gretel.

**Argument! There is an inference made, and all on its own, the statement requires support.**

**Premise: Liesel, Hansel, or Gretel went to the witch's house.**

**Premise: Liesel didn't go.**

**Conclusion: Hansel or Gretel went.**

e. Small cars are generally fuel efficient, and the new hybrid cars are not only fuel efficient, they also conserve energy by operating on battery power. Supposedly, car companies are working on developing fuel efficient SUVs.

**Report. There is no inferential flow.**

f. If you loved me, then you wouldn't keep all the chocolate for yourself. But you keep all the chocolate for yourself. So, you must not love me.

**Argument! The indicator word, "So," alerts you to the conclusion.**

**Premise: If you loved me, then you wouldn't leave me.**

**Premise: You did leave me.**

**Conclusion: You don't love me.**

g. Geraldo has been practicing the clarinet for three years. He is diligent and studious, which are requisites of proficiency. As a result, he is a proficient player.

**Argument!** The two premises connect to yield the conclusion.

**Premise:** Geraldo has been practicing the clarinet for three years.

**Premise:** Geraldo is diligent and studious, which are requisites of proficiency.

**Conclusion:** Geraldo is a proficient player.

h. Scientists are hailing the Mars expedition as a technological and scientific triumph.

This is a single sentence. Recall that at least two statements are required for an argument. Even if this compound statement was broken down to its constituent parts, the two would not be related inferentially. "Scientists are hailing the Mars expedition as a technological triumph." "Scientists are hailing the Mars expedition as a scientific triumph." One does not imply the other.

### **Exercise Set 19**

1. **Instructions:** Next to, or below each indicator word or phrase, write "Premise" or "Conclusion" as appropriate:

a. Since

**Premise**

b. Therefore

**Conclusion**

c. So

**Conclusion**

d. As a result

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**Conclusion**

e. Because

**Premise**

f. It may be inferred from

**Premise**

g. Consequently

**Conclusion**

h. Given that

**Premise**

i. Hence

**Conclusion**

**2. Instructions:** In 1-3 grammatical sentences, explain when words are *not* premise- or conclusion-indicator words.

What we take to be premise or conclusion indicator words are not signals of argument elements when, for example, when they indicate a chronological or causal sequence. “The result of the flood was the displacement of many people from their homes.” Here, “result” is not proof of something previously unknown. Instead, it is a result in the sense of an effect of a cause.

**Exercise Set 20**

Here the focus is on distinguishuishing between premises that support a conclusion well, and those that don’t. If you find that there are too many

missing premises, or that there seems to be little relation between premises and conclusion, there's probably bad inference-making going on.

Moreover, we've already had a bit of practice identifying missing, or implicit, premises. Lots of times these assumptions are bad, which is precisely why they're not stated. We hadn't identified them previously as good or bad, but here we want to make sure we can distinguish between what does, and what does not, provide good support for a conclusion.

**1. Instructions:** Read the following story and then list all the good inferences. In 1-2 grammatical sentences, explain why they are good. Next, make a list of the bad inferences, and explain why they are bad.

"The Missing Piece"

It was a dreary Saturday afternoon: dark and pouring rain. Lupe thought it would be fun to go for a walk down to the river and look for frogs, but her older sister, Carina, hated the rain, and hated frogs even more. Besides, her boyfriend was coming over soon. Apparently, none of Lupe's friends were interested in playing in the rain, either. Everyone she called was either ensconced in their rooms with books and music, or off to a matinee with their families. *I guess I could go frog hunting alone*, she thought, looking out the window. More often than not, Lupe enjoyed solitude, and relished the time she spent alone exploring the woods near her family's home. But today she felt like doing something with someone.

Just then, the doorbell rang, and Lupe went to answer it. It was Carina's boyfriend, Sifredo, and he had a bag of movies in his hand! "Goody!" she cried. "What did you bring?"

"Who says you're invited?" Carina said, smiling, as she came down the stairs to greet Sifredo.

"I didn't," Lupe responded haughtily, and turned on her heel to resume looking out the window.

"Oh, stop," Carina said. She and Sifredo followed Lupe into the living room to watch the movies. "See what 'Fredo has. I'm sure there's something here you'll like."



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"Why do you say that?" Lupe pouted. "How do you know what I like?"

"Uh, hello, I live with you?"

Sifredo started stacking the videos on the coffee table. There was something for everyone: action/adventure, romance, and an animated movie about zoo animals. Carina help up the zoo movie. "See, Lupe? 'Fredo didn't forget you."

Lupe eyed the movie, but didn't leave her post at the window.

"We'll start it without you..." Sifredo tempted her. He got up and put the tape in the VCR. No sooner had the movie begun playing than there was a loud crack of thunder, followed by a flash of lightening. Immediately thereafter, the power went out.

"Oh, no!" Carina groaned. "Perfect timing!"

"The lightning must have hit a transistor," Sifredo said. "It'll probably be a while before the power company gets things working again."

"Well, what do we do now?" Carina huffed.

"Do you have any board games?" he asked.

"Sure. Tons."

"Let's see 'em."

Carina and Sifredo went to the cupboard to look through the games, and Carina and Sifredo's dad came in with some candles. "Oh, hello, Sifredo. I thought one of Lupe's little friends was here to go stomping through puddles."

"No," Lupe huffed, "they're all doing other stuff."

"It's just as well," he replied. "I don't want you catching cold in all that wet weather."

"Oh, *Dad*," Lupe rolled her eyes.

"It's nice to see you, Mr. Pinello," Sifredo shook Mr. Pinello's hand warmly.

"Likewise," he smiled. "Oh, here are some candles. It's a little dark in here."

"Thanks," Carina said, taking them from his hand. "We're going to play *Whodunnit*, so they'll come in handy. Hey, do you want to play, Dad? Then we can have teams."

"Sure, I haven't played *Whodunnit* in years. I'll be a little rusty, but it'll be fun."

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"Well," Carina laughed, "if you're anything like you were the last time we played, you'll win every game!"

"Come on, Lupe," Sifredo said, "play with us. We need a fourth."

"Well, if Dad doesn't play, then I don't have to."

"Stop being a pouty-puss. Besides, just because Dad is playing doesn't mean you *have* to. We just want you to play."

"Well, I wanted you to hunt frogs with me. Look what that got me."

Carina set the box on the table, and Sifredo and Mr. Pinello began setting up pieces. "We can be partners," Mr. Pinello offered. "You and me."

At that, Lupe's face brightened, and she moved to the coffee table to help them set up.

Carina found a box of matches and lit the candles. "That's nice, isn't it?" she smiled.

"Let me read the rules of the game," Mr. Pinello said, reaching for the box top. "I have to refresh myself."

*With four players, teams are divided into two teams of two. "Okay, two players for each team."*

"duh, Dad!"

"Thank you, partner Lupe," he winked. "I appreciate your support."

"Sorry, sorry. Keep going."

*"Okay." The neighborhood of Cleansville is experiencing an unfortunate crime wave. The goal is to determine who is responsible amongst the notorious Cleansville criminals: Sticky Finger Fred, Sammy the Smoothie, Light Touch Lucy, or Mendacious Marty. Each team of detectives begins on Main Street in front of the police station. Roll the dice, moving as many spaces as the roll count allows. Then take a card from the deck. On it will be a clue to the identity of the criminal. Match the clue to the location on the board. Each team gathers as many clues as possible while the sand clock is 'on.' When the clock runs out, team members compile their evidence and then suggest a culprit and a crime.*

"I remember all that," Lupe said proudly. "It's a cinch. Ready, Dad?"

"Ready."

"Lupe, why don't you and Dad roll first?" Carina suggested.

"Okay." She picked up the dice and blew on them for luck. "Works every time," Lupe grinned. "Ready to start the clock?"

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Sifredo nodded, and Lupe threw the dice. Five steps. This took her to an alley behind the pet store. Her card read, "Mendacious Marty denies everything." Lupe showed her card to her dad, who nodded sagely. "Your go," Lupe said.

Soon enough, the clock had run out, and the players had amassed a fair amount of evidence. Lupe and her father learned that: Mendacious Marty denies everything at the pet store. Light Touch Lucy was seen at the pet store the night of the theft. They also learned that Sammy the Smoothie and Sticky Finger Fred were on the other side of town while Lucy was at the pet store. Carina and Sifredo learned that: A shipment of rare birds was supposed to arrive at the pet store, but never did. The truck depot, where all Cleansville shipments arrive, is across town from the pet store, near where Sammie and Fred were last seen. Fred has an allergy to feathers. Marty owes Sammie money.

"This is a tough one," Mr. Pinello said.

"I know, we're stumped," Sifredo agreed.

"I don't think Light Touch Lucy did it," Lupe announced. "And I can tell you why."

"Okay, in a minute. Let's look at everyone else, first. Marty has to be lying," her father suggested.

"It can't be Fred," Sifredo declared.

"So, Sammie did it."

"Uh-uh," Mr. Pinello shook his head. "Marty did it. Marty stole the birds to pay Sammie back, because he owed him money."

"But I want to say something about Light Touch Lucy!" Lupe cried.

"Okay, what have you concluded?"

"Why was Lucy at the store if she wasn't waiting for the birds to arrive? She was expecting them that night, otherwise why else would she be there? If she was on lookout, wouldn't she have been at the truck depot instead?"

"Good point, hon," Mr. Pinello said.

"Yeah," Carina agreed. "I think Lucy can be counted out, and you get your points for that. But what about Sammie and Marty?: They both have good reasons to steal, and certainly Sammie was in the right part of town to do it."

"Maybe something's missing," Sifredo offered. "Both Sammie and Marty are good suspects... Something has to distinguish them."

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"Oh, no!" Lupe cried. "One of my cards is really two stuck together!"  
"What does it say? What does it say?" everyone asked eagerly.  
"So that would've been my card," Sifredo said.  
"Sorry," Lupe handed it over.

**Good inferences:**

**1. Carina tells Lupe there's a movie Lupe will like among those Sifredo brought.**

**Explanation:** Carina should know Lupe's likes and dislikes well enough since they're related and live together. Moreover, Sifredo seems to have brought at least one movie from every genre, and if Lupe likes movies at all, there's probably one in there to suit her tastes.

**2. Sifredo's inference that the power went out because lightening hit a transistor.**

**Explanation:** Unless a fuse was blown, the bad weather is the most likely cause of the power outage.

**3. The power company won't get things up and running again anytime soon.**

**Explanation:** If it's true that a transistor is out, it will take a while to fix. In addition, it's a weekend, so there are likely less technicians on duty.

**4. Lupe and Carina's father thinks he'll be rusty playing *Whodunnit*.**

**Explanation:** If he hasn't played in a while, he might not remember all the rules and strategies of the game.

**5. Carina says (conditionally) that her father will win every game.**

**Explanation:** Since he used to win "all the time," he should be a good player, rusty or not.

**6. Lupe's claim that Light Touch Lucy didn't commit the crime.**

**Explanation:** here is Lupe's reasoning: "Why was Lucy at the store if she wasn't waiting for the birds to arrive? She was expecting them that night,

otherwise why else would she be there? If she was on lookout, wouldn't she have been at the truck depot instead?"

Bad inferences:

1. Lupe thinks she's going to watch the movies that Sifredo has brought over.  
Explanation: Just because Sifredo is carrying movies doesn't mean they're for Lupe's viewing.

2. Carina and Lupe's father thought the doorbell was rung by one of Lupe's friends.

Explanation: Unless he had prior information, how could he make a good guess about who was at the door?

3. Lupe's father thinks Lupe could catch cold from the weather.

Explanation: That's a myth!

2. **Instructions:** Generate a piece of evidence missing in the story above. Write a scenario in which it turns out that the missing piece of evidence links Mendacious Marty to the bird theft.

Feel free to be creative here. You should construct scenarios that fit with the evidence.

3. **Instructions:** In each argument below, a premise or conclusion is missing which would make the argument more complete, and as such either stronger or weaker. Rewrite the argument, filling in the missing premise. Next, based on that missing premise, determine whether or not the argument is better or worse for it being stated explicitly.

This is an important part of the process of critical thinking. In our ordinary conversations we do not often present our thinking clearly, coherently, and completely. There are often implied conclusions, missing premises, and assumed premises. The problem with missing elements is that, if stated, it becomes clear that the reasoning is not as good as it seemed at first glance.

a. If Lolly likes Erik or Fred, Bill is disappointed. So, Bill is disappointed.

**Premise:** If Lolly likes Erik or Fred, Bill is disappointed.

**Missing Premise:** Lolly likes either Erik or Fred.

**Conclusion:** Bill is disappointed.

The missing premise, when made explicit, creates a argument stronger.

b. If Lolly likes Erik or Fred, Bill is disappointed. Therefore, Bill is not disappointed.

**Premise:** If Lolly likes Erik or Fred, Bill is disappointed.

**Missing Premise:** Lolly does not like either Erik or Fred.

**Conclusion:** Bill is not disappointed.

The missing premise does not make the argument stronger. There's no good way to get to the conclusion without doing a lot of work, and even then it won't be strong. Most people make the mistake of thinking that a denial of the antecedent results in a denial of the consequent. Adding the missing premise shows how poor the argument is. Think about it this way: "If there are questions, we'll discuss the matter further." You could discuss the matter further even if there aren't any questions. Or consider the following: "If I have two nickels, I have ten cents." But if you don't have two nickels, you could still have ten cents. Perhaps you have a dime!

**Remember, denying the antecedent does not result in a denial of the consequent!**

c. Rebecca is older than Luis. Donata is younger than Percy. So, Rebecca is older than Donata.

**Premise:** Rebecca is older than Luis.

**Missing Premise:** Luis is older than Percy.

**Premise:** Donata is younger than Percy.

**Conclusion:** Rebecca is older than Donata.

Without the missing premise, it's not at all clear how Rebecca's being older than Donata can be inferred from the given premises.

d. If it rains tonight, the baseball game will be canceled. If the game is canceled, Bobo will hang out at the pizza parlor tonight. Bobo is not at the pizza parlor tonight.

**Premise:** If it rains tonight, the baseball game will be canceled.

**Premise:** If the game is canceled, Bobo will hang out at the pizza parlor tonight.

**Premise:** Bobo is not at the pizza parlor tonight.

**Conclusion:** It's not raining tonight.

Suppose you think that the conclusion is "Bobo is not at the pizza parlor tonight." How they would go about "getting to" that conclusion? Suppose you say the missing premise is, "It is raining tonight." That means that the game will be canceled. The canceled game, in turn, will bring Bobo to the pizza parlor. But this is exactly the opposite of what the purported conclusion is.

Consider instead that what's missing is the conclusion. Work backwards from Bobo not being in the pizza parlor. Bobo not being in the parlor means the game wasn't canceled, which means it wasn't raining.

e. The geological patterns on Mars suggest there was rain on that planet at one time. So, there was likely life on Mars at one time.

**Premise:** The geological pattern on Mars suggests there was rain on that planet at one time.

**Missing Premise:** Rain means there was water on the planet.

**Missing Premise:** Water is required for life.

**Conclusion:** There was likely life on Mars at one time.

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f. People who are spoiled don't want to work hard. People who don't want to work hard expect everything to be done for them.

**Premise:** People who are spoiled don't want to work hard.

**Premise:** People who don't want to work hard expect everything to be done for them.

**Conclusion:** People who are spoiled expect everything to be done for them.

g. Our society is full of people who think that ethics is relative. These people say, 'There is no such thing as right or wrong, only what each individual believes is right or wrong.' They've just shown, however, how wrong they are.

**Premise:** Our society is full of people who think that ethics is relative.

**Premise:** These people say, 'There is no such thing as right or wrong, only what each individual believes is right or wrong.'

**Missing Premise:** To make such a statement is to make a universal — not a relative — claim.

**Conclusion:** By making such a claim, they've just shown how wrong they are. Yes, this is a tough one. It requires a bit of thinking, but students are more than capable, especially given the work they've done on paying attention to language, of seeing the complete argument.

h. The minimum wage is so low, there's no point in getting a job. You can make more money on welfare.

**Premise:** The minimum wage is not a living wage.

**Missing Premise:** You can make more money on welfare.

**Missing Premise:** The only point of having a job is to make a living wage.

**Missing Premise:** Welfare pays more than the minimum wage.

**Conclusion:** The minimum wage is so low, there's no point in getting a job.

i. Whenever liquor stores appear, so does crime and unscrupulous people. The quality and safety of neighborhoods are threatened by such businesses, and children are exposed at an early age to alcohol.



**Premise:** Whenever liquor stores appear, so does crime and unscrupulous people.

**Missing Premise:** Unscrupulous people and crime are often connected with alcohol consumption.

**Missing premise:** Criminals who drink alcohol tend to consume alcohol close to the store where the alcohol was purchased.

**Missing premise:** Criminals who drink alcohol tend to commit their crimes close to the location where they were drinking the alcohol.

**Premise:** The quality and safety of neighborhoods are threatened by such businesses, and children are exposed at an early age to alcohol.

**Conclusion:** To preserve the quality and safety of neighborhoods, liquor stores should not be allowed to open in residential neighborhoods.

Notice a fair amount of work had to be done to connect the premise with the conclusion.

j. That is not a skunk. It doesn't have a white stripe down its back.

**Premise:** Only skunks have white stripes down their backs.

**Missing Premise:** That creature does not have a white stripe down its back.

**Conclusion:** That [creature] is not a skunk.

k. Most Politicians are dissemblers, so there's no reason to believe anything they say.

**Missing Premise:** Politicians have to persuade people.

**Missing Premise:** Persuading people often requires dissemblance.

**Premise:** Most politicians are dissemblers.

**Missing Premise:** It's very difficult to determine when dissemblers are lying or telling the truth.

**Missing Premise:** It's always best to disregard what dissemblers say.

**Conclusion:** There's no reason to believe anything [politicians] say.

It's always best to avoid general statements that are opinions because, as with exercise i., a lot of work has to be done to back up those opinions. Even then, it's difficult to obtain consent about their truth.

I. That wrinkly-looking dog is a Shar-Pei.

Missing Premise: Shar-Peis are wrinkly-looking dogs.

Missing Premise: There is a wrinkly-looking dog.

Conclusion: That wrinkly-looking dog is a Shar-Pei.

All by itself, the sentence is not an argument. Given our goal in this exercise set, however, we have created one, with the opinion becoming a conclusion. The conclusion may be false, but at least there's now some support for it.

## Exercise Set 21

Notice that the sorts of exercises you've been working on have prepared you to understand deductive argument forms. The concepts in this section can be very difficult for some students. It is important that you master these concepts, however, so that when you move on to fallacious reasoning, you are armed with the tools to distinguish good from poor reasoning. In addition, when you move on to logic proofs, you must be comfortable with the fundamental concepts required for constructing proofs. Finally, deductive reasoning gives you a structure they can apply when approaching arguments — deductive argument forms are formulas for a particular sort of argument. As such, they can be "mapped" onto a wide variety of reasoning instances, thereby testing the quality of that reasoning.

1. **Instructions:** In 1-3 grammatical sentence, explain what "logic" means?

The term comes from the Greek, *logos*, which means, among other things, reason and accounting. The field of logic is the study of the principles of argumentation, specifically the methods by which necessary truths can be demonstrated.

**2. Instructions:** In 1-3 grammatical sentence, explain what a deductive argument is.

**An argument in which the truth of the premises is claimed to entail, sufficiently support, or guarantee the truth of the conclusion.**

**3. Instructions:** In 1-3 grammatical sentence, explain the purported relationship of premises to conclusion in a deductive argument.

**The premises are claimed to be guarantee the conclusion, or the conclusion is said to follow from the premises necessarily. The purported relationship is one of noncontradiction: the conclusion can't be false, if the premises are true.**

**4. Instructions:** Identify the following arguments according to their form (eg, Modus Ponens, Hypothetical Syllogism). You might find it helpful to diagram the argument according to the formulas listed for each argument form in the text, or lay out each argument in standard form, using the original language:

a. Derek or Maria is going to the game tonight. Maria's going to the game tonight, since Derek is not going.

**Premise: Derek or Maria is going to the game tonight.**

**Premise: Derek is not going.**

**Conclusion: Maria's going to the game tonight.**

**A or B**

**A**

**B**

**Disjunctive Syllogism.**

b. If Trudy likes a dress, she buys it. Trudy likes this dress. So, she buys it.

**Premise: If Trudy likes a dress, she buys it.**

**Premise: Trudy likes this dress.**

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**Conclusion: Trudy buys it.**

**If A then B**

A

B

**Modus Ponens.**

c. If Trudy likes a dress, she buys it. She doesn't buy this dress, so she doesn't like it.

**Premise: If Trudy likes a dress, she buys it.**

**Premise: She didn't buy this dress.**

**Conclusion: She didn't like it.**

**If A then B**

Not A

Not B

**Modus Tollens.**

d. If Randall comes home late from work, he won't have much time to study for his college entrance exams. If he doesn't have much time to study for his college entrance exams, he will worry about getting into college. So, if Randall comes home late from work, he's going to worry about getting into college.

**Premise: If Randall comes home late from work, he won't have much time to study for his college entrance exams.**

**Premise: If he doesn't have much time to study for his college entrance exams, he will worry about getting into college.**

**Conclusion: If Randall comes home late from work, he's going to worry about getting into college.**

**If A then B**

If B then C

**If A then C**

**Hypothetical Syllogism.**

e. Technology is created by human beings. Human beings are imperfect creatures. So, technology is imperfect.

**Premise: Technology is created by human beings.**

**Premise: Human beings are imperfect creatures.**

**Conclusion: Technology is imperfect.**

**All A are B**

**All B are C**

**All A are C**

**If you want to make the negation in “imperfect” explicit, the form looks like this:**

**All A are B**

**No B are C**

**No A are C**

**Categorical Syllogism.**

f. If Randall worries about getting into college, he won't be able to concentrate on his studies, and if he has to work a lot, then he doesn't have much time to read for pleasure. Either Randall is worried, or he has to work a lot. So, either Randall won't be able to concentrate on his studies, or he doesn't have much time to read for pleasure.

**Premise: If Randall worries about getting into college, he won't be able to concentrate on his studies, and if he has to work a lot, then he doesn't have much time to read for pleasure.**

**Premise: Either Randall is worried, or he has to work a lot.**

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**Conclusion:** Either Randall won't be able to concentrate on his studies, or he doesn't have much time to read for pleasure.

If A then B, and if C then D

A or C

B or D

**Constructive Dilemma.**

g. I've got a quarter. So, either I have a quarter or I have a nickel.

**Premise:** I've got a quarter.

**Conclusion:** Either I have a quarter or I have a nickel.

A

A or B

**Addition.**

h. Belinda and Carmichael are sitting. So, Belinda is sitting.

**Premise:** Belinda and Carmichael are sitting

**Conclusion:** Belinda is sitting.

A and B

A

**Simplification.**

i. Belinda is sitting. Carmichael is sitting. Therefore, Belinda and Carmichael are sitting.

**Premise:** Belinda is sitting.

**Premise:** Carmichael is sitting.

**Conclusion:** Belinda and Carmichael are sitting.

A

B

A and B

**Conjunction.**

**5. Instructions:** There are missing premises or conclusions for the arguments below. In the spaces provided, rewrite the argument with the appropriate premise or conclusion so the resulting argument matches one of the deductive argument forms:

a. If Diana feels unwell, she won't go to the party. Therefore, she won't go to the party.

**Premise:** If Diana feels unwell, she won't go to the party.

**Premise:** Diana feels unwell.

**Conclusion:** Diana won't go to the party.

**If A then not B**

A

Not B

**Note:** I've made the negation of the consequent explicit, but notice this has nothing to do with the form of the argument.

**Modus Ponens**

b. Gayanne or Diana will go to the party. Diana's not going.

**Premise:** Gayanne or Diana will go to the party.

**Premise:** Diana's not going.

**Conclusion:** Gayanne will go to the party.

A or B

Not A

B

**Disjunctive Syllogism.**

c. Diana doesn't feel unwell. She's going to the party.

**Premise: If Diana doesn't go to the party, she feels unwell.**

**Premise: Diana doesn't feel unwell.**

**Conclusion: [It's not the case that she's not going to the party.] She's going to the party.**

**If not A then not B**

Not B

Not not A

**Notice I've preserved the double negation, which does not affect the form of the argument.**

**Modus Tollens.**

d. Giraffes are long-necked animals. So, giraffes can reach high places for food.

**Premise: Long-necked animals can reach high places for food.**

**Premise: Giraffes are long-necked animals.**

**Conclusion: Giraffes can reach high places for food.**

**All A are B**

All B are C

**All A are C**

**Categorical Syllogism.**

e. Belinda is at the party.



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**Premise:** Belinda is at the party.

**Conclusion:** Either Belinda is at the party or Chloe is at the party.

A

A or B

**Addition.**

You could also create two premises in a Disjunctive Syllogism form, for which  
“Belinda is at the party,” is a conclusion:

A or B

Not A

B

f. Shannon and Tucker are at the party.

**Premise:** Shannon and Tucker are at the party.

**Conclusion:** Shannon is at the party. [Alternatively, Tucker is at the party.]

A and B

A

**Simplification**

You can also construct two premises for a Conjunction argument consisting of  
“Shannon is at the party,” and “Tucker is at the party,” and the conclusion  
would be “Shannon and Tucker are at the party.” Here is the form:

A

B

A and B

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g. If Shannon goes to the party, then Tucker goes, and, if Diana is feeling unwell, then Belinda will not go to the party. So, either Tucker is going to the party or Belinda will not go.

**Premise:** If Shannon goes to the party, then Tucker goes, and, if Diana is feeling unwell, then Belinda will not go to the party.

**Premise:** Either Shannon goes to the party or Diana is feeling unwell.

**Conclusion:** Either Tucker is going to the party or Belinda will not go.

**If A then B, and if C then D**

**A or C**

**B or D**

**Constructive Dilemma**

h. Tucker is at the party. Belinda is not at the party.

**Premise:** Tucker is at the party.

**Premise:** Belinda is not at the party.

**Conclusion:** Tucker is at the party but Belinda is not at the party.

**A**

**Not B**

**A and not B**

**Conjunction**

i. No tarantulas are cuddly. All teddy bears are cuddly.

**Premise:** No tarantulas are cuddly.

**Premise:** All teddy bears are cuddly.

**Conclusion:** No tarantulas are cuddly.

**No A are B**

**All C are B**

No A are C

### Categorical Syllogism

j. Lydia or Tammy eats pizza. So, Tammy eats pizza.

**Premise: Lydia or Tammy eats pizza.**

**Premise: Lydia does not eat pizza.**

**Conclusion: Tammy eats pizza.**

A or B

Not A

B

### Disjunctive Syllogism

**6. Instructions:** Read the following passage and extract the deductive argument form. In the space provided, write out the argument in its appropriate deductive form. You will need to rewrite the statements in order to fit the particular deductive form, but be sure to preserve the meaning:

Knowing what to do is a requirement for acting rightly. Otherwise, one acts rightly by accident. Acting rightly by accident does not guarantee that one will act rightly consistently. Imagine something that you do not know how to do. It can be anything from playing volleyball to playing a violin, or knowing how to do a calculus problem, changing the oil on a car, or writing a computer program. If you happen to do it right, it won't be because you knew what you were doing, and it would be extremely difficult to duplicate doing it right another time.

**If you act rightly, you know what to do. If you don't know what to do, and you act rightly, you act by accident. If you act rightly by accident, you cannot act consistently.**

**One more step is required, since currently there is no conclusion, and drawing one will yield more premises than any of the deductive forms have. The first statement is implied in the second, so it can be conceptually subsumed into it.**

If you don't know what to do, you act rightly by accident. If you act rightly by accident, you cannot act consistently. Therefore, if you don't know what to do, you cannot act consistently.

If A then B

If B then C

If A then C

### Hypothetical Syllogism

#### Exercise Set 22

1. **Instructions:** In 2-3 grammatical sentences, explain the concept of noncontradiction, and why it is important to the concept of validity.

The concept is inherent in the concept of necessity, which is the relation between premises and conclusion in a valid argument.

2. **Instructions:** In 1-2 grammatical sentences, explain a valid argument.

A valid argument is what all deductive arguments purport to be. Here are several ways to talk about the definition of validity (some logicians disagree on the precise nature):

1. An argument whose premises are sufficient to yield the conclusion.
2. An argument in which, if the premises are true, the conclusion must be true.
3. An argument whose premises, assuming they are true, entail the conclusion.

3. Yes or No: Can a valid argument have true premises and a false conclusion? Explain your answer in 1-2 grammatical sentences.

No! The condition proposed above would mean that the conclusion can contradict the premises, and the definition of validity denies contradiction between premises and conclusion.

4. Yes or No: Can a valid argument have false premises and a true conclusion?

**Yes! Remember, it's the structure that makes an argument valid or invalid!**

**Here's an example of an argument with at least one false premise, and a true conclusion:**

**The moon's surface is made of green cheese or (among other things) metallic iron.**

**The moon's surface is not made of green cheese.**

**The moon's surface is made of (among other things) metallic iron.**

5. Yes or No: Can a valid argument have false premises and a false conclusion?

**Yes! Remember, it's the structure that makes an argument valid or invalid!**

**Here's an example of an argument with at least one false premise, and a false conclusion:**

**The moon is made of green or blue cheese.**

**The moon is not made of green cheese.**

**The moon is made of blue cheese.**

6. Yes or No: Can statements be valid?

**No! In logic, only *arguments* are valid.**

**7. Instructions:** Assuming the premises of the following arguments are true, and the conclusions are false, determine which can be maintained without contradiction. In those cases, use the **counterexample method** to demonstrate invalidity:

**When learning about deductive arguments, it's important for you to move away from looking at the *actual truth* of premises and conclusions, and begin to look at the *structure* of the argument, or *relation* of supposedly true premises to the supposedly true conclusion.**

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a. Some flowers are roses. Some roses are red. So, some flowers are red.

The concepts of roses and redness are not connected by necessity through this argument structure. Assume the premises are true. Next assume the conclusion is false. Can students maintain the truth of the premises simultaneous with the falsity of the conclusion? Yes.

Some apples are green things. Some green things are avocados. So, some apples are avocados.

b. No dogs are kittens. Some kittens are white. So, no dogs are white.

Just because no dogs are kittens and some kittens are white does not mean that dogs can't be white. So, we can see that, though it's true no dogs are kittens, and it's true some kittens are white, we can assert that it's false that no dogs are white without thereby contradicting the premises.

No dogs are cats. Some cats are friendly creatures. So, no dogs are friendly creatures.

c. You will have soup or salad. You will not have soup. So, you will have salad. The assumed truth of the premises and the assumed falsity of the conclusion cannot be maintained without contradiction. If it's true that one or the other is the case, and one is not the case, then it must be the other.

This is a disjunctive syllogism:

A or B

Not A

B

d. All fish live under water. Eels are not fish. So, eels do not live under water.

There is no contradiction by making the conclusion false. Just because the premises are actually true, and the conclusion is actually false, students are to

look for whether or not the *assumed* truth of the premises entails the truth of the conclusion. In this case, no. We do not need to create a counterexample, since the premises are actually true, and the conclusion is false. Nevertheless, another example may help clarify the error:

All cats are animals.

No dogs are cats. [Dogs are not cats.]

No dogs are animals. [Dogs are not animals.]

e. All birds fly. Sparrows are birds. Therefore, sparrows fly.

If it's true that all birds are in the category of fliers, and it's also true that sparrows are birds, then sparrows are in the category of fliers, too. To deny it is to contradict the premises. This argument is a categorical syllogism:

All A are B

All C are A

All C are B

f. If Tanya works hard, she'll feel she's accomplished something. Tanya does work hard. So, she'll feel like she's accomplished something.

Recall that when the antecedent has been affirmed, or obtained, the consequent follows. To deny it is to engage in a contradiction. This is a modus ponens argument:

If A then B

A

B

g. Arnold and Thomas are here. So, Thomas is here.

If both Arnold and Thomas are here, how is it possible to claim that Thomas is *not* here? That is the definition of a contradiction, to claim that something is and is not the case at the same time. This is a version of Simplification:

**A and B**

**B**

h. If flowers are put in sunlight, they grow. The flowers are growing. So, the flowers have sunlight.

No contradiction obtains when the premises are assumed to be true and the conclusion is assumed to be false. This is a version of an invalid argument form known as affirming the antecedent. It is an imposter; it mimicks modus ponens. Here is each, side-by-side:

Modus Ponens	Affirming the Consequent
If A then B <u>A</u> B	If A then B <u>B</u> A

If I have ten pennies, I have ten cents.

I have ten cents.

I have ten pennies.

i. If Raiza likes Will, she asks him to a movie. In fact, Raiza does like will. So, Raiza asks Will to a movie.

Recall that when the antecedent has been affirmed, or obtained, the consequent follows. To deny it is to engage in a contradiction. This is a modus ponens argument:

If A then B

A\_\_\_\_\_

**B**

j. Technology helps humankind. Some things that help humankind are bad for the environment. So, technology is bad for the environment.



**No contradiction is generated. Here is a counterexample:**

**Dogs are animals.**

**Some animals are birds.**

**Dogs are birds.**

k. All cats are animals. All dogs are animals. So, all cats are dogs.

**No contradiction is generated. Again, remember the goal is not the *actual* truth of the premises and conclusion, but whether or not the former can be assumed true while the latter is assumed false. The premises are true, and the conclusion is false, so there is no need to generate a counterexample.**

**8. Instructions:** Determine whether or not the following arguments are valid or invalid:

a. Los Angeles is in California. San Francisco is in California. So, Los Angeles is in San Francisco.

**Invalid**

b. Boston is in California. California is in the United States. Therefore, Boston is in the United States.

**Valid**

c. If Boston is in California, then Boston is a coastal city. Boston is in California. So, Boston is a coastal city.

**Valid**

d. Hollywood is a city in California. Hollywood is a city in Florida. Therefore, California is in Florida.

**Invalid**

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e. If New York City is in Massachusetts, then it's on the east coast. New York City is on the east coast. So, New York City is in Massachusetts.

**Invalid**

f. San Diego is south of Los Angeles. San Francisco is north of Los Angeles. Therefore, San Diego is south of San Francisco.

**Valid**

g. Cleveland is a city in Ohio. Ohio is in the Midwest of the United States. So, Cleveland is a city in the Midwest.

**Valid**

h. If Oregon is the cheese capital of America, then mice love Oregon. Oregon is not the cheese capital of America. Therefore, mice don't love Oregon.

**Invalid**

i. Arkansas is in the southern United States. The southern United States gets very hot in the summer. So, Arkansas gets very hot in the summer.

**Valid**

j. Canada is north of Wyoming. Alaska is north of Wyoming. So, Canada is north of Alaska.

**Invalid**

k. Delaware is a small state south of Rhode Island. Rhode Island is a small state north of New Jersey. Therefore, New Jersey is a small state.

**Invalid**

### Exercise Set 23

1. **Instructions:** in 1-2 grammatical sentences, explain what is a sound argument.

**Soundness makes up for any frustration with truth that validity creates. A sound argument is valid, *and* the premises are actually true.**

2. Yes or no? Are all valid arguments sound?

**No! Remember, a sound argument is valid and the premises are actually true. Some valid arguments are unsound:**

**The moon is made of blue or green cheese.**

**The moon is not made of blue cheese.**

**The moon is made of green cheese.**

3. Yes or no? Are all sound arguments valid?

**Yes, since validity is part of the definition of soundness.**

4. **Instructions:** Determine if the following arguments are valid or invalid and sound or unsound. Be sure to choose one of each, and state the truth-value of each of the premises and conclusions:

**Recall that a statement's truth-value is that statement's truth or falsity.**

a. Some insects fly. Some insects are beetles. So, some beetles fly.

- **Invalid**
- **Unsound**
- **Premises and conclusion are true.**

b. If Mars is red, then it is made of tomato paste. Mars is red. So, it's made of tomato paste.

- **Valid**

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- **Unsound**
- **False premise #1 and conclusion; true premise #2**

c. Mexico is south of the United States. Brazil is south of the United States. So, Brazil is south of Mexico.

- **Invalid**
- **Unsound**
- **True premises and conclusion**

d. Leopards have spots. Dalmatians have spots. So, leopards are Dalmatians.

- **Invalid**
- **Unsound**
- **True premises; false conclusion**

e. If acorns grow, they become oak trees. Acorns do grow. So, acorns become oak trees.

- **Valid**
- **Sound**
- **True premises and conclusion**

f. World War II occurred after World War I. The Korean War occurred after World War II. Therefore, the Korean War occurred after the WWI.

- **Valid**
- **Sound**
- **True premises and conclusion**

g. Rectangles are four-sided figures. Some desks are four-sided figures. So, some desks are rectangles.

- **Invalid**
- **Unsound**
- **True premises; false conclusion.**

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h. Leo owns a telescope. People interested in astronomy own telescopes. So, Leo is interested in astronomy.

- **Valid**
- **We can't be sure of the soundness, since we don't know who Leo is and whether or not he actually owns a telescope.**

i. Leo owns a telescope. Only people interested in astronomy own telescopes. So, Leo is interested in astronomy.

- **Valid**
- **We can't be sure of the soundness, since we don't know who Leo is and whether or not he actually owns a telescope.**

j. If you're interested in gardening, you read gardening books. Dannon reads gardening books. So, Dannon is interested in gardening.

- **Invalid**
- **Unsound**
- **We can't be sure of the truth of the second premise and conclusion, since we don't know who Dannon is and whether or not he actually reads gardening books.**

k. You read gardening books only if you're interested in gardening. Dannon reads gardening books. So, Dannon is interested in gardening.

- **Valid**
- **We can't be sure of the soundness, since we don't know who Dannon is and whether or not he actually reads gardening books.**

l. If Dannon reads gardening books, then he is interested in gardening. Dannon reads gardening books. So, Dannon is interested in gardening.

- **Valid**

- We can't be sure of the soundness, since we don't know who Dannon is and whether or not he actually reads gardening books.

m. Tanisha or Raymond is fifteen-years-old. Tanisha is fifteen-years-old. So, Robert is not fifteen-years-old.

- Invalid
- Unsound
- The actual truth of the premises is not known, since we don't know who Tanisha or Raymond are.

### Exercise Set 24

These are more commonly found in everyday life than are deductive arguments. Once you get through the section on deductive arguments, the less rigorous concept of the inductive argument may feel like a relief! At the same time, the fact that there is uncertainty in the evaluation concept of strength means that the borderline cases may be difficult to assess.

**1. Instructions:** In 1-3 grammatical sentences, explain what is an inductive argument.

An argument in which the premises are claimed to support the conclusion such that the conclusion is probably true.

**2. Instructions:** In 1-3 grammatical sentences, explain what is the difference between an inductive and a deductive argument.

With a deductive argument, the relationship between premises and conclusion is one of necessity, while the relationship between premises and conclusion in an inductive argument is probable. Some logicians will claim that any invalid argument is either inductively strong or weak. We have not pursued this point, but you may find it makes thinking about deductive and inductive reasoning more accessible.

3. **Instructions:** List the types of inductive arguments:

- **Prediction**
- **Analogy**
- **Cause and Effect Signs, Authority, Generalization, Argument from the Past.**

4. **Instructions:** In 1-3 grammatical sentences, explain what is the difference between a strong and a weak argument.

**A strong arguments premises provide compelling empirical support for the conclusion, so that it's quite likely the conclusion is true if the premises are true. A weak argument's conclusion is tenuously related to the premises.**

5. **Instructions:** In 1-3 grammatical sentences, explain what is the difference between a cogent and an uncogent argument.

**An argument is an inductive argument whose true premises support a probably true or probably false conclusion. An uncogent argument is one that has false premises, but the conclusion is still true.**

6. **Instructions:** Identify the following arguments according to their pattern:

a. My doctor recommends that I go on a diet and start exercising. She says I am fifteen pounds overweight and that my blood pressure is high. So, I'm going to start exercising and watch what I eat.

**Argument from Authority**

b. Bonnie loves yellow roses, so I'm sure she'll like these red roses.

**Argument from Analogy**

c. Turn left at the next light, onto Elm. Google says the house is at the end of that street.

**Argument from Authority**

d. The young tomato plant got plenty of water, sunlight, and good soil. The combination of those three things made the tomato plant grow strong and healthy.

**Cause and effect argument**

e. The sun rises in the east and sets in the west every day. Today, it will set in the east.

**Argument from Prediction**

f. I bought a container of raspberries, but they're all bad. Every one I took out was all moldy.

**Argument to a Generalization**

g. There are lots of seashells all over the mountain behind my house. So, that mountain, and so also the land where my house is, was once under water.

**Argument to the Past**

h. Last night Recep and Sarah shared an appetizer at Tasty Nate's diner. This morning Recep is feeling really unwell. He must have food poisoning from something he ate at Tasty Nate's.

**Cause and Effect Argument**

**Exercise Set 25**

1. **Instructions:** Determine which of the following arguments are cogent or uncogent and strong or weak:

a There are dinosaur fossils all over the place. It won't be long before we see a live dinosaur.



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- **Weak**
- **Uncogent**

b. Volleyball is a game that uses a ball. So is baseball. So, volleyball and baseball are pretty much the same sport.

- **Weak**
- **Uncogent**

c. The mailbox in front of this condemned house says that the Smiths live here. It's too bad the Smith family lives in a condemned house.

- **Weak**
- **Uncogent**

d. Frogs eat rabbits, so they must croak up hair-balls all the time.

- **Weak**
- **Uncogent**

e. It's a cold winter, just like any other. Therefore, there must not be anything to this idea of global warming.

- **Weak**
- **Uncogent**

f. Every U.S. president has been a male. We just elected a male president. So, for the foreseeable future, U.S. presidents will also be male.

- **Strong**
- **Cogent**
- **The evaluation depends in part on what we mean by "foreseeable future."**

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g. Dolphins and whales are air breathing aquatic animals. Sharks are aquatic creatures, too. So, sharks also breath air.

- **Weak**
- **Uncogent**

2. **Instructions:** Determine which of the following arguments are deductive and which are inductive. Make your determination based on the type of argument pattern it follows. Next, if the argument is deductive, determine whether it is valid or invalid, and sound or unsound. If the argument is inductive, determine whether it is strong or weak, and cogent or uncogent.

a. You said you would be waiting out front of your apartment if you wanted to go to the movies with me today. When I arrived, you weren't out front, so I knew you didn't want to go to the movies.

- **Deductive**
- **Valid**
- **We can't be sure of the soundness, since we don't know the who "you" and "I" are.**

b. When Jessie and Patrick arrived at Aunt Gladys' house this afternoon for a surprise visit, there were newspapers piled up at the front door, the front porch light was on, the front lawn was overgrown, and all the shades were drawn. There was no car in the driveway, nor in the garage, and the oil spots on the garage floor were drying out. They decided she hadn't been there for days.

- **Inductive**
- **Strong**
- **Cogent (assuming the premises and conclusion are true).**

c. There are so many violent video games, violent television shows, and violent movies. It's no wonder that there's so much violence in our society.

- **Inductive**
- **Strong**
- **Cogent**

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d. No skrittles are barfumps. All barfumps are galleywumps. So, no skrittles are galleywumps.

- **Deductive**
- **Valid**
- **Unsound. Unless we stipulate a definition, we can safely say “skrittles,” “barfrumps,” and “galleywumps” are nonsense terms.**

e. Either Duane is imagining things, or he’s just seen Elvis perform in Las Vegas. Duane’s not imagining things. So, he’s just seen Elvis perform in Las Vegas.

- **Deductive**
- **Valid**
- **Soundness can’t be determined because we do not know enough to determine the truth-values of the statements.**

f. Either Shaz is going to be ready for the big horse show next month, or Barry will be proud of his riding students. For, if Shaz practices riding every day, she’ll be ready for the big horse show next month, and if Barry teaches well, he’ll be proud of his riding students. Either Shaz is practicing riding every day, or Barry is teaching well.

- **Deductive**
- **Valid**
- **Soundness can’t be determined because we don’t know Shaz or Barry, and so can’t determine the truth of the statements.**

g. Constance is afraid of dogs. She’s had bad experiences with aggressive dogs, and so will be nervous about Peter’s dog, which is coming down the street with Peter.

- **Inductive**
- **Strong**
- **Cogency can’t be determined.**

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h. When Carol visited her friend, LaKeisha, in Seattle for two weeks, it rained practically every day, and was cloudy when it wasn't raining. Carol decided she wouldn't want to live somewhere that had mostly dreary weather.

- **Inductive**
- **Strong**
- **Cogency can't be determined.**

i. The clock on the wall says it's 3:15. We'd better hurry if we want to get to the library before it closes at 5:00.

- **Inductive**
- **Strong**
- **Cogency can't be determined.**

j. If the library is closed, we'll incur late fees, since, if the library is closed, we won't get to return our books when they're due. If we don't get to return our books when they're due, we'll incur late fees.

- **Deductive**
- **Valid**
- **Sound (provided libraries do, in fact, charge late fees)**