

1 . Answer: A

Explanation:

An “Either A or B” statement implies that a person has two choices. Selecting one from the choices implies that the person did not select the other. That is, if a person selected A then he/she certainly did not select B.

Michael has two choices: (1) he will go to the shop to buy new tools or (2) borrow tools from his neighbor. If Michael went to the shop today, then it means that he did not borrow tools from his neighbor.

2. Answer: B

Explanation: In this case, it is helpful for us to create an illustration of the given situation.



Shown above is a flowchart presenting the situation. If the price of the bicycle declines by 20%, either Allen’s mom or Allen’s aunt will buy the bicycle. If the price of the bicycle does not decline by 20%, then no one will buy the bicycle.

Looking at the diagram, Allen’s mom will buy him the bicycle if the price of the bicycle declines by 20% next month and if Allen’s aunt will not buy him the bicycle.

Alternative Method:

The statement “*If A then either B or C*” is logically equivalent to “*If A and not B then C*”

Thus, the given statement is logically equivalent to “*If the price of the bicycle declines by at least 20% next month and Allen’s aunt will not buy him the bicycle, then Allen’s mom will buy the bicycle*”

Therefore, the necessary condition for Allen’s mom to buy the bicycle is when the price of the bicycle declines by at least 20% next month and Allen’s aunt will not buy him the bicycle.

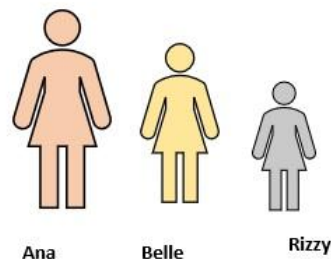
3. Answer: A

Explanation: We will use the symbol “ $>$ ” to state that someone is taller than the other.

It was stated that $Ana > Belle$ and $Belle > Rizzy$. Thus, $Ana > Rizzy$.

From the given options, only option A is TRUE since Ana is taller than Rizzy which is equivalent to the statement that “Rizzy is shorter than Ana”.

You can also make an illustration to answer the question:



Notice that it is true that Rizzy is shorter than Ana.

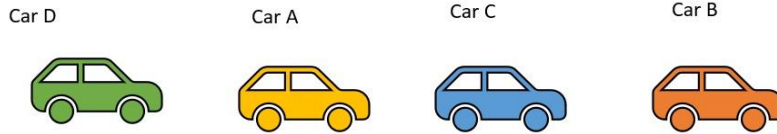
4. Answer: A

Explanation:

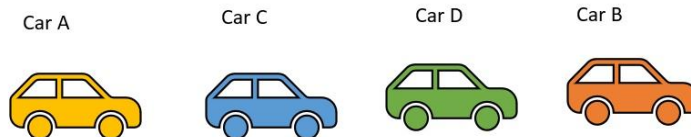
Our strategy in this problem is to divide each statement into several parts and providing an illustration to each parts:

It was stated that *Car A is behind Car B, Car D is behind Car A while Car C is in between Car A and Car B.*

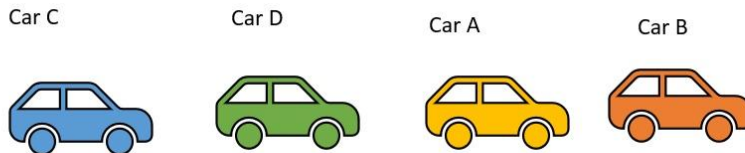
Illustrating this situation:



If Car D overtakes Car C ...



and Car A overtakes Car D...



and Car C overtakes Car A



Looking at the final illustration, Car A is behind Car C.

5. Answer: A

Explanation:

This question is an example of a “syllogism” in which there are given premises and we are going to determine a conclusion for these premises.

In the given problem, the premises are: *All members of the institute are participants of the annual conference. All participants of the annual conference are chemists. Salazar is a participant of the annual conference.*

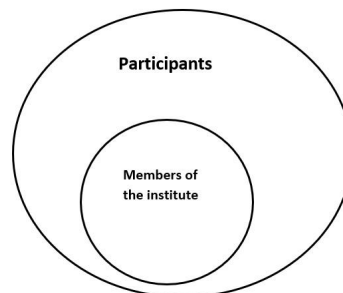
We can divide the given premises as:

- I. All members of the institute are participants of the annual conference.
- II. All participants of the annual conference are chemists.
- III. Salazar is a participant of the annual conference.

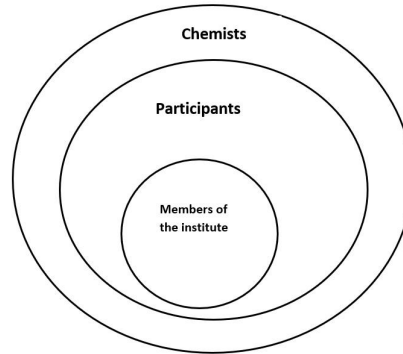
One method to solve syllogism problems is using venn-diagrams. We are going to use venn-diagrams for each premise.

I. All members of the institute are participants of the annual conference.
This means that the members of the institute are just a subset or a part of the participants of the annual conference.

Visualizing using venn diagram:

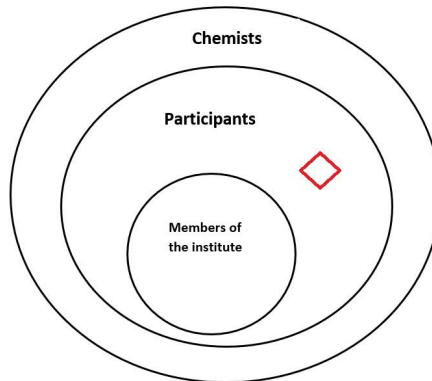


II. All participants of the annual conference are chemists.
This means that the participants of the annual conference are just a subset or a part of all the people who are chemists.



III. Salazar is a participant of the annual conference.
In this premise, we can imagine that Salazar is part of the circle in the venn-diagram representing the participants.

We represent Salazar as a red diamond in the venn-diagram:

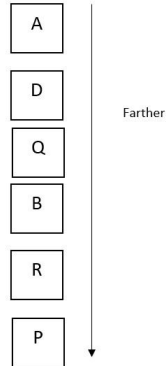


From the given options, only option A is certainly true.

6. Answer: A

Explanation:

Shown below is an illustration of the given situation:



From the illustration, City Q is the fourth farthest city from City A.

7. Answer: C

Explanation:

Shown below is an illustration of the given problem:



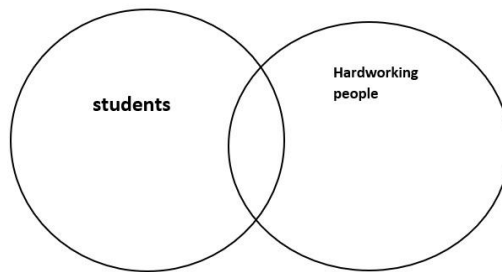
From the illustration, it is option C *The desk is the most expensive of the items* is false since the most expensive of the given items is the oven toaster.

8. Answer: D

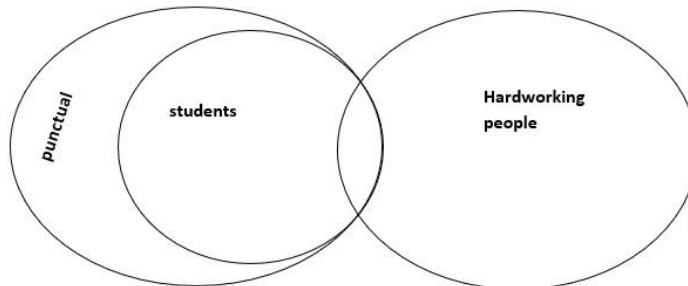
Explanation:

We can illustrate the given premises in the problem as:

Some hard working people are students. The illustration looks like this:



All students are punctual. Our illustration will look like this:



To determine which of the given options is certainly true, we will use elimination:

(A) Jen is a student - it is given that Jen is hardworking. Thus, Jen is in the “hardworking” circle. However, we are not certain if she also belongs to the intersection of the “student” and “hardworking” circles. We only know that Jen is part of the “hardworking” circle. Thus, this statement is not certainly true.

(B) Jen is a punctual student- it was stated on the premise that all students are punctual. However, we already proved in option A that it is uncertain whether Jen is a student or not. Thus, this option is also not certainly true.

(C) Jen is not a student - this is just the same with option A. Jen is part of the “hardworking” circle. However, we are not certain if she does not belong to the intersection of the “student” and “hardworking” circles. We only know that Jen is part of the “hardworking” circle. Thus, this statement is not certainly true.

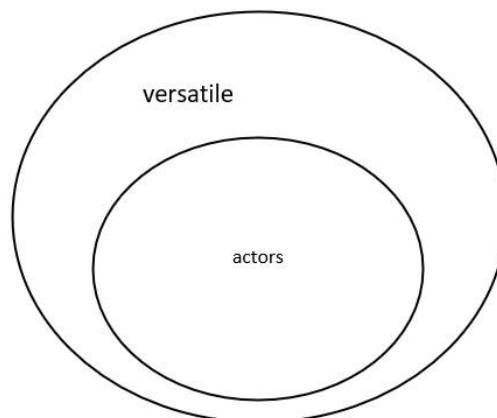
Thus, all of the options are not certainly true.

9. Answer: B

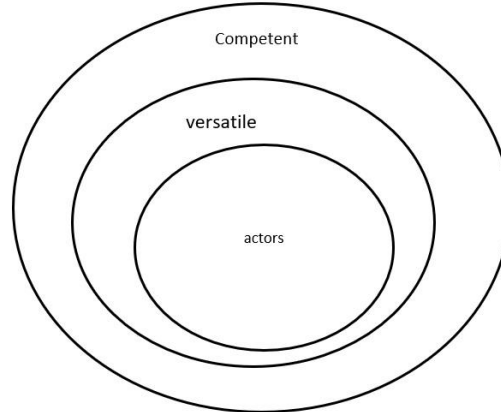
Explanation:

Using Venn-Diagram:

All actors are versatile people can be represented as:



All versatile people are competent can be represented as:



Thus, the statement *All competent people are actors* is false since there are competent people who do not belong to the set of actors (as shown in the venn diagram).

10. Answer:

Explanation: The statement *If the student obtained an average of at least 89% in this semester, then he is qualified for the dean's award* is in the form of "If A then B" statement.

Statements of the form "If A then B" is logically equivalent to "If not B then not A"
Thus, if the student did not qualify for the dean's award, then the student's average is less than 89% this semester.

Note: The logical equivalence of "If A then B" and "If not B then not A" is called the law of contrapositive.

11. Answer: D

Explanation: The term *tomorrow's yesterday* is simply "today" or "present". Thus, if the day after tomorrow's yesterday (today) is Monday, then today is Sunday.

The term *yesterday's tomorrow* is simply "today". We already know that today is Sunday. Thus, the day after yesterday's tomorrow (today) is Monday.

12. Answer: D

Explanation:

XYUIOWTD - roundtable
OWTDAXYZ - tabletop
AXYOJJU - topfloor

From the given, **XYUI** represents round, **OWTD** represents table, **AXYZ** represents top, and **OJJU** represents floor.

Therefore, XYUIOJJU means XYUI + OJJU = round + floor = roundfloor.

13. Answer: C

Explanation: Shown below is an illustration of the given statement:

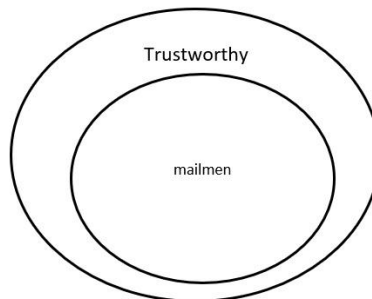


Looking at the illustration, only option C *Letty's basket has fewer fruits than Carrie's basket* is true.

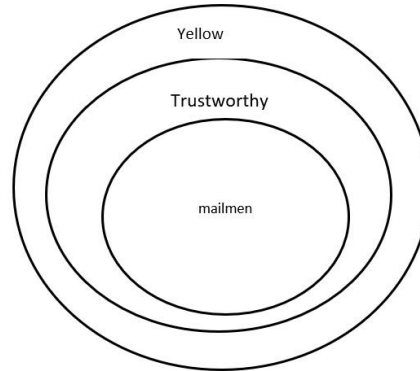
14. Answer: A

Explanation:

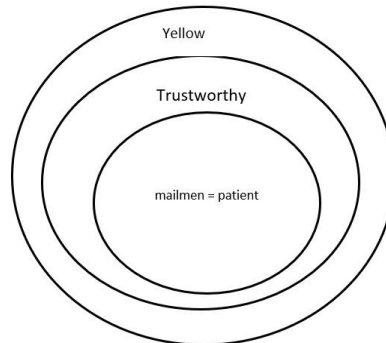
All mailmen are trustworthy can be represented using venn-diagram as:



All trustworthy people are wearing yellow can be represented as:



Only patient people are mailmen implies that the set of mailmen is just the same as the set of patient people.



All people who are patient are wearing yellow means that the set of patient people is a subset or a part of the set of people who are wearing yellow. We can confirm that this statement is true as shown in the venn-diagram above since the “patient” circle is inside the “yellow” circle.

15. Answer: A

Explanation:

PQTYUIOU - background
UIOUERXT - groundwater
TYRYUIOU - underground

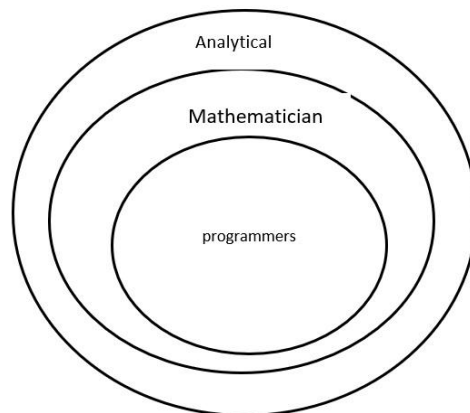
PQTY represents back, **UIOU** represents ground, **ERXT** represents water, and **TYRY** represents under.

Therefore, **ERXT** is the representation for the word "water".

16. Answer: C

Explanation:

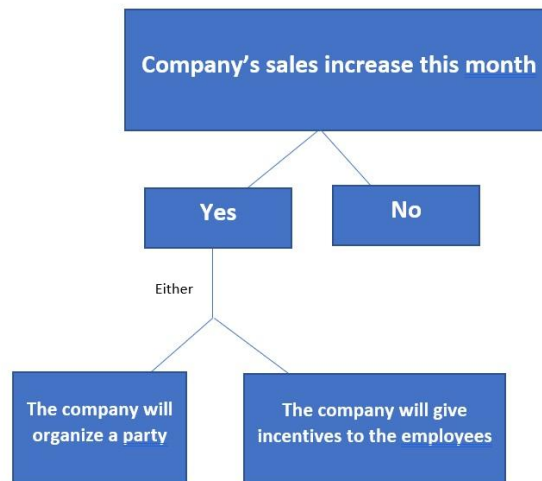
The given premises can be represented by the venn-diagram below.



It was given that Arwin is a mathematician. Among the given options, only option C is true since the set of mathematicians is a subset or a part of the set of analytical persons (as shown by the venn-diagram).

17. Answer: D

Explanation: Shown in the next page is a diagram that presents the given situation:



As we can see from the diagram, the necessary condition for the company to give incentives to the employees is when the company's sales increase this month and the company did not organize a party for the employees.

18. Answer: C

Explanation: The premise stated that Some of the visitors of the person's mother are wealthy. This implies that not all of the visitors are wealthy. We cannot guarantee from the premise that Jessie is wealthy if the only information that we have is that she is a visitor to the person's mother.

19. Answer: C

Explanation: The statement "If Jessie obtained a higher grade in her classes, she will watch the newly released movie. If she watches the newly released movie, then she will buy a new headset" is in the form of "If A then B, If B then C" statement.

The statement "If A then C" is a valid argument from "If A then B, If B then C". Thus, If Jessie obtained a higher grade in her classes, then she will buy a new headset.

Note: "If A then C" being a valid argument from "If A then B, If B then C" is called Hypothetical Syllogism or Transitivity of Implication.

20. Answer:

Explanation: Shown below is a diagram presenting the given situation:



From the illustration, the stove is the third most expensive item.