Worksheet 10/14/2024

Inductive argument: conclusion drawn by generalizing specific premises. An inductive argument is *strong* if it makes a compelling case for its conclusion.

Deductive argument: conclusion follows as a specific case of a general premise. A deductive argument is *valid* if its conclusion follows logically from its premise, regardless of the truthfulness of the premise. A deductive argument is *sound* if it is valid and its premise is true.

Determine if the following argument is inductive or deductive. If it is inductive, assess the strength of the argument. If it is deductive, draw a Venn diagram and determine if the argument is valid and/or sound.

1. Sara went to the library, and then Ann went. Sara went to sharpen her pencil, and then Ann went. Ann is copying Sara today.

2. Today, the sun came up and shone in the windows on the back of our house. Tomorrow, the sun will also shine through the windows on the back of the house when it arises.

3. All European countries are countries in the European Union. Denmark is a European country. Denmark is a country in the European Union.

4. If I eat ice cream, I gain weight. If I eat cake, I gain weight. Eating dessert causes me to gain weight.

5. If it is a two-axle car, then it has four wheels. Volkswagens are two-axle cars. Volkswagens have four wheels.

6. We surveyed 1,000 people across the county and 520 of them said they will vote to re-elect the mayor. We estimate that 52% of the county will vote for the mayor and he will be re-elected.

7. All vegetables are green. Beans are green. Beans are vegetables.

8. All banks are closed on national holidays. Today is Memorial Day, so my bank must be closed today.

9. Everyone in my family is right-handed, so my children will be right-handed.

Use set notation (braces) to write the members of the following sets or state that the set has no members. You may use three dots (…) to indicate patterns.

1. The perfect squares between 11 and 56.

2. The states that share a border with the state of Utah.

3. The states that share a border with the state of Hawaii.

4. The dates of February 2023.

Choose ALL the sets in the list natural numbers ($\mathbb{N}$), integers ($\mathbb{Z}$), rational numbers ($\mathbb{Q}$), and real numbers ($\mathbb{R}$) that contain each of the following numbers.

5. 45

6. 0

7. -3/4

8. -7

9. 2.12121212...

10. π

11. $\sqrt{3}$

12. $\sqrt{9}$

13. $\pi/6$

Draw Venn diagrams showing the relationship between the following sets.

14. high school students and people with driver's licenses

15. shirts and clothing

16. poets and plumbers

17. women and American presidents

18. odd numbers, perfect squares, and numbers ending with 7