Geometry Homework #19

1) If the diameter of a circle is 22 and the center is the point $(4,-7)$, find the equation of the circle.

2) If the center of a vertical ellipse is the point $(-2,-5)$ and the minor axis is 8 while the major axis is 18, find the equation of the ellipse.

3) Using nothing more than a straightedge and a compass, construct a triangle, of any shape and size, create the perpendicular bisectors of each side, and find the point where all three bisectors intersect each other. What is special about this particular point?

4) If the equation of a circle is $(x-9)^2 + (y-4)^2 = 49$, determine its radius and center.

5) If the equation of an ellipse is $\dfrac{(x-2)^2}{100} + \dfrac{(y+3)^2}{64} = 1$, determine the center and the length of the minor and major axes.

6) Determine the characteristics of the following logical argument and justify your answers by explaining which logical parameters are met, or not met, and why. If, and only if, a quadrilateral is a parallelogram, then the opposite sides of the quadrilateral are parallel.

7) Is the following an example of inductive or deductive reasoning. Assume that all statements/premises are true. If it is deductive, determine which logical parameters are met. If it is inductive, find at least one counterexample that disproves the conclusion. If birds are frogs and frogs are elephants, then birds are elephants.

8) Abigail, Jacob, Chloe, Derrick, and Andrew each received a gift from Rebecca. The gifts Rebecca has to give are a piece of fruit, a cake she baked, a book, a music CD, and a hat. Determine who received which gift based on the following statements or premises. Abigail likes to read, so her gift was perfect. Chloe can't eat her gift, but Jacob can. Neither the music CD nor the hat was given to Derrick. Either Derrick or Abigail was given a piece of fruit. Andrew was either given cake or the music CD.

9) Determine the characteristics of the following logical argument and justify your answers by explaining which logical parameters are met, or not met, and why. If Andrew is a boy and Chloe is a girl, then Abigail is a fish.

10) Is the following an example of inductive or deductive reasoning. Assume that all statements/premises are true. If it is deductive, determine which logical parameters are met. If it is inductive, find at least one counterexample, with reasoning, that disproves the conclusion. If the first five number of a sequence are 24, 25, 26, 27, and 28, then the next number in the sequence is 29.

11) Each of four friends, Jacob, Chloe, Derrick, and Abigail, is given $7,000 each to invest in the stock market. Each chooses a different stock. One chooses a utility stock, another chooses an automotive stock, another chooses a technology stock, and the other chooses an oil stock. From the following true statements and premises, determine which person bought which stock. Jacob and the owner of the utility stock purchased their shares through an online brokerage, whereas Chloe and the owner of the automotive stock did not. The gain in Derrick's stock is twice the gain in value of the automotive stock. The technology stock is traded on NASDAQ, whereas the stock that Chloe bought is traded on the New York Stock Exchange.

12) Determine the characteristics of the following logical argument and justify your answers by explaining which logical parameters are met, or not met, and why. If a figure is a regular hexagon, then the closed figure has six sides.

13) Is the following an example of inductive or deductive reasoning. Assume that all statements/premises are true. If it is deductive, determine which logical parameters are met. If it is inductive, find at least one counterexample, with reasoning, that disproves the conclusion. If you are given the equation $y = x^2 - x + 11$ where x is any whole number, then y is always a prime number.

14) Derek, Abigail, Andrew, and Chloe were the winners in The Phillips Academy Math Contest. There was a winner in each of four categories: basic math, introductory algebra, geometry, and intermediate algebra. From the following statements and premises, determine which person won which category. None of the winners were determined at the same time. The winner of the basic math contest was determined before Andrew won his contest. This year's math contest was the first for Abigail and for the winner of the intermediate algebra contest. Derek and the winner of the basic math contest entered last year's math contest. The winner of the introductory algebra contest was not the first one determined. Abigail was not the winner of the introductory algebra contest.

15) Determine the characteristics of the following logical argument and justify your answers by explaining which logical parameters are met, or not met, and why. If cows are animals and goats are animal, then cows are goats.

16) Is the following an example of inductive or deductive reasoning. Assume that all statements/premises are true. If it is deductive, determine which logical parameters are met. If it is inductive, find at least one counterexample, with reasoning, that disproves the conclusion. If x is any real number, then $\dfrac{x^2 - 36}{x + 6} = x - 6$.

17) The cities of Atlanta, Chicago, Philadelphia, and San Diego each held one convention last summer. There was a coin collecting convention, a stamp collecting convention, a comic book collecting convention, and a baseball card collecting convention. From the following true statements and premises, determine which city held which convention. The comic book collector convention was held in August, as was the convention held in Chicago. The baseball card collector convention was not held in Philadelphia, and the coin collector convention did not meet in San Diego or Chicago. The convention in Atlanta was held during the week of July 4th, whereas the coin collector convention was held the week after that. The convention in Chicago had more collectors attending it than did the stamp collector convention.

18) Determine the characteristics of the following logical argument and justify your answers by explaining which logical parameters are met, or not met, and why. If, on Tuesdays, you always go to the bank, on Wednesdays, you always go to the grocery store, the only day you go to the park is Friday, and you never leave the house on days that start with the letter T, therefore, you went to the park today.

19) Is the following an example of inductive or deductive reasoning. Assume that all statements/premises are true. If it is deductive, determine which logical parameters are met. If it is inductive, find at least one counterexample, with reasoning, that disproves the conclusion. If you choose any real number, add four to that number and multiply this sum by three, subtract seven from that product and then decrease that amount by triple the original number that you chose, then the result is always five.

20) You are driving a shuttle bus with four passengers onboard. As they enter the bus, they each tell you their first name. Their first names are Barb, Sam, Joe, and Dan. You were given a passenger list with four last names on it. Their last names are Smith, Jones, Gonzales, and Lee. Based on the following true statements and premises, determine the first and last name of each passenger. Barb's last name does not have a z in it. Sam's last name does not end in an s. Joe's last name has five letters in it. Sam's last name is not the shortest.