9/24/19- Warm Up Problem

Write the converse of the statement.

If <u>angles are complementary</u>, then <u>they add to 90 degrees</u>.

If they add to 90° then the angles are Complementary

Write a biconditional statement if possible.

Angles are comp. <u>if and only if</u> they add up to 90°.

Section 2.4 - Deductive Reasoning

Goal: Use the law of detachment and the law of syllogism to draw conclusions

Inductive Reasoning: observing patterns and past events and making a conjecture about what will happen next

Deductive Reasoning: reasoning logically from given statements to a conclusion - proving something is true using facts and rules

An auto mechanic knows that if a car has a dead battery, then the car will not start. A mechanic begins to work on the car and finds the battery is dead. What conclusion can he make?

Car will not start

<u>Law of Detachment</u>
If the hypothesis of a true if-then statement is true,
then the conclusion is also true.

Can you make a conclusion from the following statements?

If a student gets an A on the final exam,
then the student will pass the course.
Felicia got an A on her final history exam.

She passed the course

If two angles are adjacent, then they share one side.
Angle 1 and Angle 2 are adjacent.

They share one side

If it is snowing, then the temperature is less than or
equal to 32°F. The temperature is 20°F.

No conclusion

Which argument is correct?

Argument #1:

If two angles are vertical angles, then they are congruent.
<1 and <2 are congruent. So, <1 and <2 are vertical angles.

Argument #2:

If two angles are vertical angles, then they are congruent.
<1 and <2 are vertical angles. So, <1 and <2 are congruent.

If you passed 9th grade, then you are in 10th grade.
If you are in 10th grade, then you are a sophomore.

> **Law of Syllogism**
>
> If $p \rightarrow q$ and $q \rightarrow r$ are true statements, then $p \rightarrow r$ is also a true statement.
>
> You can combine two true conditional statements when the conclusion of one is the same as the hypothesis of the other.

Use the Law of Syllogism to draw a conclusion from the following true statements.

If a figure is a square, then it is a quadrilateral.
If a figure is a quadrilateral, then it has four sides.

If a figure is a square, then it has 4 sides.

If it is July, then it is summer vacation.
If it is summer vacation, Bill works in the smoothie shop.

If it is July, then Bill works in the smoothie shop.

If 2 angles are a linear pair, then they are supplementary.
If 2 angles are a linear pair, then they are adjacent.

No conclusion

Assignment:
finish Concept 5 Worksheet
- due by Friday 9/28

Deductive Reasoning – Laws of Detachment and Syllogism

If possible, use the Law of Detachment to make a conclusion. If it is not possible, explain why.

12. If a doctor suspects that a patient has a broken limb, he or she will order an X-ray.
    Dr. Olson suspects that Lilly has a broken arm.

    Dr. Olson will order an X-ray

13. If a rectangle has sides that measure 3 cm and 4 cm, then it has an area of 12 cm^2.
    Rectangle ABCD has an area of 12 cm^2.

14. If an angle is obtuse, then it is not acute.
    $\angle XYZ$ is not obtuse.

15. If a triangle is a right triangle, then it has one 90 degree angle.
    $\triangle ABC$ is a right triangle.

16. If cats prowl, then mice will scatter.
    Mice are scattering.

If possible, use the Law of Syllogism to make a conclusion. If it is not possible, explain why.

17. If you take Precalculus, then you have already taken Algebra 2.
    If you take Algebra 2, then you have already taken Algebra 1.

    If you take Precalculus, then you have taken Alg. 1

18. If I make a grilled cheese sandwich, then I will make tomato soup as a side dish.
    If I have cheese in the fridge, then I will make a grilled cheese sandwich.

19. If a whole number ends in 6, then it is divisible by 2.
    If a whole number ends in 4, then it is divisible by 2.

20. If a line goes through the midpoint of a segment, then the line bisects the segment.
    If a line bisects the segment, then it divides the segment into two congruent segments.

21. If a quadrilateral is a rectangle, then it has 4 congruent sides.
    If a quadrilateral is a rectangle, then it has 4 congruent angles.