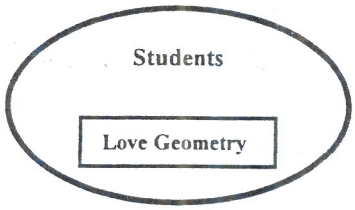
Unit 1 Venn Diagrams **Name:** _____ **Block:** ___

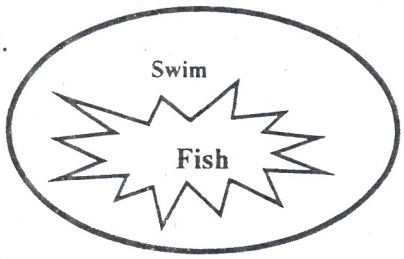
Choose the statement represented by the Venn Diagram.

1.



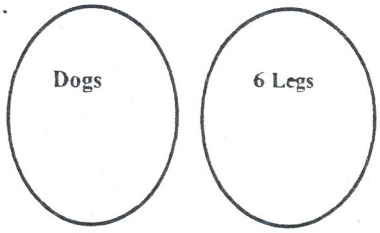
a. No student love geometry.
b. Some students love geometry.
c. All students love geometry.

2.



a. No fish can swim.
b. Some fish can swim.
c. All fish can swim.

3.



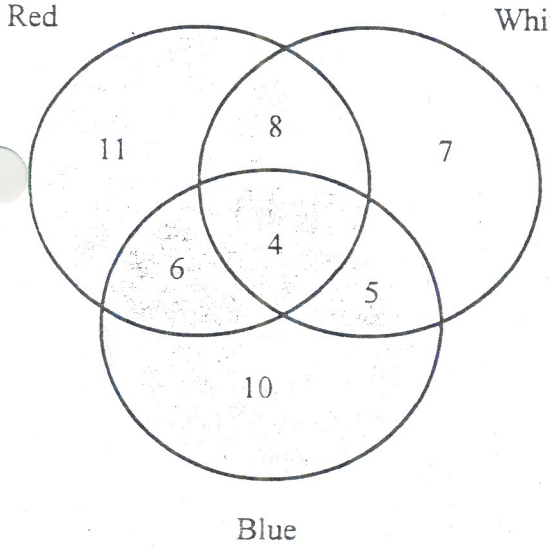
a. No dogs have 6 legs.
b. Some dogs have 6 legs.
c. All dogs have 6 legs.

Construct aVenn Diagrams that represent the following Statements.

4. No students will fail.

5. All teachers are wise.

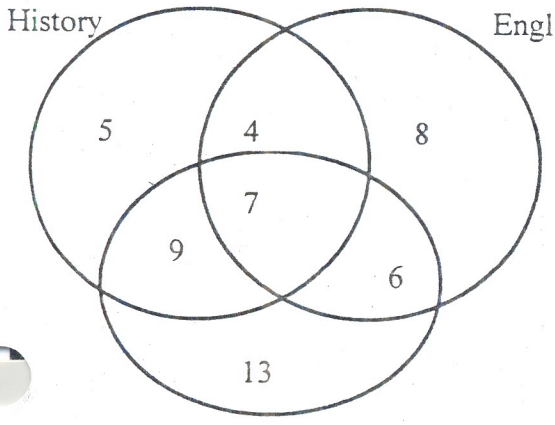
6. Some kids like junk food.



Use the Venn Diagrams to the left to answer the following question.

How many kids like.....

7. red _____
8. red only _____
9. white & blue _____
10. white or blue _____
11. red & blue _____
12. red or blue _____
13. red, white, & blue _____



How many Students are enrolled in.....

14. Math only _____
15. Math & English _____
16. English or History _____
17. English _____
18. Math or History _____
19. English & History _____
20. Math _____

Venn Diagram Practice

Name _____

Draw a Venn Diagram for problems #1 - 10
Remember to label each set.

1. All geometry students passed algebra
2. Some people like basketball.
3. Some trees are evergreen.
4. All squares are quadrilaterals.
5. No 5th graders are taking Geometry.
6. None of the students failed the test.
7. Some snakes are poisonous.

8. There were 60 customers at a concession stand. Forty customers bought only hamburgers. Thirteen people bought only cheeseburgers. Five people bought both.

9. There are 25 computers in the computer lab. Seventeen computers have WordPerfect, 15 computers have Microsoft Works, and 7 computers have both.

10. There are 70 teachers at a meeting. Fifty math teachers, 19 science teachers and 14 teachers who teach both math and science.

#1 #2

#3 #4

#5 #6

#7 #8

#9 #10

Answer the questions about the Venn Diagram to the right. Show your work.

11. How many students are involved in clubs? _____

12. How many students are involved in athletics? _____

13. How many students are **only** working after school? _____

14. How many students are working after school **and** are involved in athletics? _____

15. How many students are working **or** involved in clubs? _____

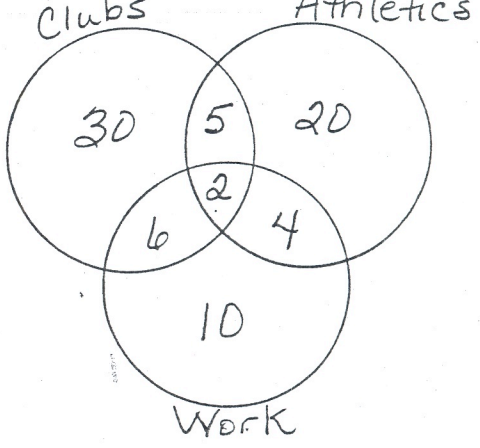
16. How many students are involved in clubs **or** athletics? _____

17. How many students are involved in clubs **only**? _____

18. How many students are represented in the Venn Diagram? _____

19. How many students are involved in all three activities? _____

#11 – #19



page two

Conditional Statements and their Variations.

Express each statement in if-then form:

1. We will play the ball game when it is not raining.
2. $y = 4$ if $3y + 6 = 18$.
3. All robins are birds.
4. A drunken driver is a menace on the highway.
5. Every 18 year old male must register with the Selective Service.

State the negation of each:

6. Algebra is interesting.
7. A week does not contain seven days.
8. Eating chocolate can make you hyperactive.
9. Mike does not own a Mercedes.
10. It is false that I am 21 years old.

Identify the hypothesis and conclusion:

11. If you find a four leaf clover, then you will have good luck.
12. If you fail a class, then you will be put on restriction.
13. All snakes are reptiles.
14. If there is a heavy snow tonight, we will not have school tomorrow.
15. If tomorrow is Sunday, then today is Saturday.

Write the converse, inverse, and contrapositive for each statement:

16. If a person plays a trumpet, then he plays a brass instrument.

17. If a person plays baseball, then he is an athlete.

Write the indicated statement, its symbolic form and determine if it is true or false (if false - write a counterexample)

18. If you find a four leaf clover, then you will have good luck. *write the converse:* _____ *symbolic form:* _____ *T or F?* ____
if false, counterexample: _____

19. If you fail a class, then you will be put on restriction. *write the contrapositive:* _____ *symbolic form:* _____ *T or F?* ____
if false, counterexample: _____

20. All snakes are reptiles. *write the inverse:* _____ *symbolic form:* _____ *T or F?* ____
if false, counterexample: _____

21. If there is a heavy snow tonight, we will not have school tomorrow. *write the converse:* _____ *symbolic form:* _____ *T or F?* ____ *if false, counterexample:* _____

22. If tomorrow is Sunday, then today is Saturday.
write the contrapositive: _____ *symbolic form:* _____ *T or F?* ____ *if false, counterexample:* _____

#6 in cardstock

Biconditional Statements

1. What phrase is used in biconditional statements? _____
2. What is the abbreviation for this phrase? _____
3. What is the symbolic form for a biconditional statement? _____
4. If a _____ statement and its _____ are both true, then the statement is a biconditional.

Rewrite each as two statements:

5. A parallelogram is a rhombus if and only if it has four congruent sides.

6. A triangle is equilateral iff it has three congruent sides.

7. A triangle is acute if and only if it contains all acute angles.

8. (a)(b) = a if and only if b = 1.

Rewrite as a biconditional statement:

9. If two lines are parallel, then the lines are on the same plane and do not intersect. If two lines are on the same plane and do not intersect, then the lines are parallel.

10. If a number is even, then it is an integer divisible by two. If an integer is divisible by two, then it is an even number.

11. If $a + b = a$, then $b = 0$. If $b = 0$, then $a + b = a$.

12. If the product of two integers is odd, then the two factors are odd. If two integers are odd, then the product of the integers is odd.

#7 in cardstock

Unit 1 Law of Detachment **Name:** _____ **Bell:** ___

Use the Law of Detachment to determine if the reasoning is valid or invalid.

1. If you wear Air Jordans, then you will play basketball.
   Allen Iverson plays basketball.
   Therefore he wears Air Jordans. _____

2. If you wash my car, then I'll pay you $10.00.
   Sydney is washing my car.
   Therefore, I will pay her $10.00 _____

3. If you love to eat, then you love hamburgers.
   Lamont really loves to eat.
   Therefore he loves hamburgers. _____

4. If Samantha goes to the beach, then she will swim.
   Samantha is swimming.
   Therefore, Sam is at the beach. _____

Use the Law of Detachment to make a conclusion. If a conclusion can not be made write No Conclusion.

5. If Steven makes good grades, then he will get a car.
   Steven made all A's this semester.

   Therefore, _____

6. If Andre passes the Geometry SOL, then Mr. Ellis will buy him pizza.
   Mr. Ellis brought him pizza.

   Therefore, _____

7. If an angle is a right angle, then it measures 90 degrees.
   Angle 2 is a right angle.

   Therefore, _____

8. If there is heavy snow on Sunday evening, then we will not have school on Monday.
   School is closed on Monday.

   Therefore, _____

9. If you love walking, then you will walk to work.
   David walks to work everyday.

   Therefore, _____

10. If you like pizza, then you will enjoy Pizza Hut's Pizza.
    Clayton likes to eat pizza.

    Therefore, _____

#8 in cardstock

Unit 1 Law of Syllogism **Name :** _____ **Block :** __

Write the symbolic form for the laws of Syllogism & Detachment in the spaces provided below.

Detachment	**Syllogism**
_____	_____
_____	_____
_____	_____

Use the Law of Syllogism to determine if the following conclusions are valid or invalid. If the conclusion is invalid write the valid statement.

1. If I work hard, then I'll make good grades.
   If I make good grades, then I'll get a scholarship.
   ∴ If I get a scholarship, then I'll work hard.

   _____

   _____

2. If you live in Norfolk, then you live in Virginia
   If you live in Virginia, then you live in the U.S.
   ∴ If you live in Norfolk, then you live in the U.S.

   _____

   _____

Using the Law of Syllogism complete the following argument. If no conclusion can be made then write "No Conclusion."

3. If I go to school, then I must attend class.
   If I must attend class, then I must study.

   ∴ _____

4. If I can walk, then I can skip.
   If I can jog, then I can run.

   ∴ _____

5. If I pay attention in class, then I'll take notes.
   If I take notes, then I'll pass the class.

   ∴ _____

6. If you are a senior, then you are about to graduate.
   If you are about to graduate, then you must prepare for the future.

   ∴ _____

7. If I get my drivers license, then I can drive legally.
   If I get my drivers license, then I'll buy a car.

   ∴ _____

Using the Law of Detachment complete the following argument. If no conclusion can be made then write "No Conclusion."

8. If you are reading this paper, then you really love math.
   Leroy really loves math.

   ∴ _____

9. If you like music, then you will watch videos.
   Stacey enjoys music.

   ∴ _____

10. If you take Spanish, then you have a foreign language class.
    Bruce is enrolled in Spanish.

    ∴ _____

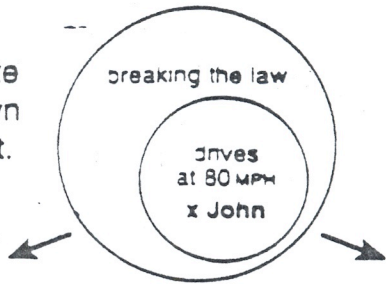
11. If I get a good job, then I'll have a lot of money.
    Mr. Brooks has a lot of money.

    ∴ _____

DIRECT REASONING (law of detachment)

For 1–3, look at the picture and write two forms of the argument, as shown in the example, on a separate sheet.

Example:

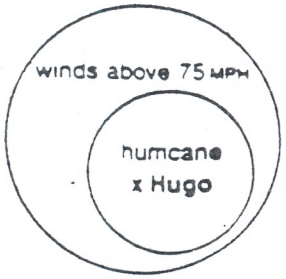


Premise:	Everyone who drives at 80 MPH is breaking the law.	$p \rightarrow q$: If you drive at 80 MPH, th you are breaking the law
Premise:	John is driving at 80 MPH.	p : John is driving at 80 MPH
Conclusion:	John is breaking the law.	q : John is breaking the law.

1.

2.

3.



For 4–9, draw the proper conclusion and give the corresponding diagram, as in 1–3.

4. If the density of a substance is less than 1, measured in grams per cubic centimeter, then the substance will float in water. The density of oak is between 0.6 and 0.9.
We can thus conclude that _____

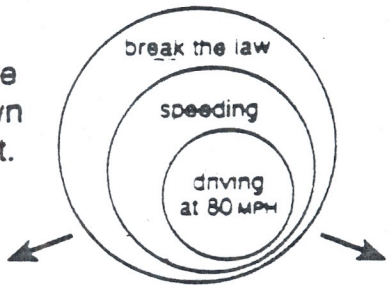
5. Classical Doric architecture used symmetry and geometric regularity for aesthetic reasons. One of the best preserved Doric temples is the Basilica at Paestum in southern Italy.
We can thus conclude that _____

6. If a, b, and c are real numbers, then $a(b + c) = ab + ac$. These three numbers are real numbers 2.1, −8, and 17.
We can thus conclude that _____

TRANSITIVE REASONING (law of syllogism)

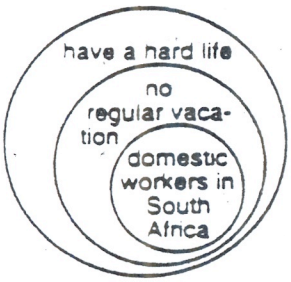
For 1–3, look at the picture and write two forms of the argument, as shown in the example, on a separate sheet.

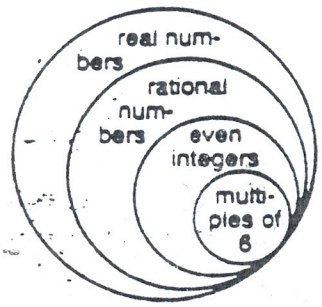
Example:



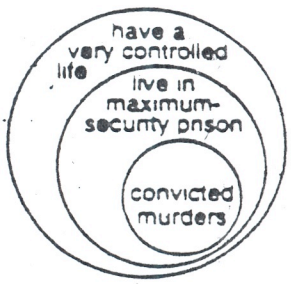
Premise:	Everyone who drives at 80 MPH is speeding.	$p \rightarrow q$: If you drive at 80 MPH, then you are speeding.
Premise:	All who speed break the law.	$q \rightarrow r$: If you speed, then you are breaking the law.
Conclusion:	Everyone who drives at 80 MPH breaks the law.	$p \rightarrow r$: If you drive at 80 MPH, then you are breaking the law.

1.





3.



For 4–9, draw the proper conclusion and give the corresponding diagram, as in 1–3.

4. All nineteenth-century impressionist painters painted from real life. All nineteenth-century painters who painted from real life broke away from the classical tradition.
We can thus conclude that _____

5. All rational numbers are real numbers. All real numbers are complex numbers.
We can thus conclude that _____

6. If you voted for Oregon's "Measure 16," then you support euthanasia. If you support euthanasia, then you believe in some form of doctor-assisted suicide. We can thus conclude that _____

9 + #10 in cardstock

Set 2.2 **Decide whether the statements $p \wedge q$ and $p \vee q$ are true or false for each pair of given statements.**

1. p: The product of two even integers is even.
   q: The sum of two even integers is odd.

2. p: February is the second month of the year.
   q: An hour has sixty minutes.

3. p: The y-intercept of the line $3y = x + 5$ is 5.
   q: The slope of the line $y + 2x = 5$ is 2.

4. p: Some multiples of 4 are odd.
   q: All multiples of 6 are even.

5. p: For each natural number x, $2x + 2$ is even.
   q: There is a rational number x such that $4x + 5 = 13$.

6. p: August is the eighth month.
   q: October has 30 days.

Find the truth value of each compound statement.

7. $2 + 1 = 3$ or $6 + 5 = 12$.

8. $4 < 7$ or $6 - 10 = 4$.

9. $-2 < 1$ and $4 > 2$.

10. A foot is less than an inch and greater than a centimeter.

11. Water boils at 32° Fahrenheit and 100° Celsius.

Consider each statement, if you think the statement is false, then give a counterexample,

12. All months have 30 days.

13. Every point on a sphere is equidistant from the center of the sphere.

14. For each natural number n, $8n - 1$ is a prime number.

15. If a natural number is odd, then it is not a prime number.