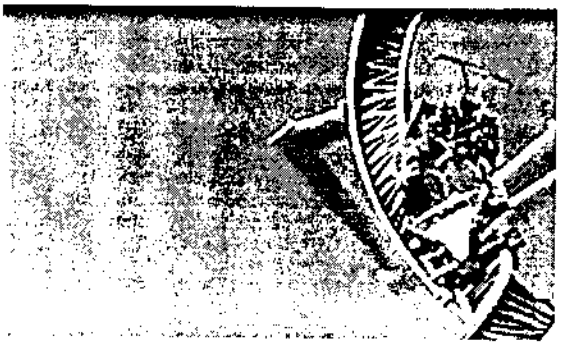
Sheet 6

# GEO022504 GEOMETRY Deduce-tion



Following each of the numbered statements below are three lettered statements. Identify the relationship of each of the lettered statements to the numbered statements if possible. Write "converse", "inverse", "contrapositive", "original statement" or "none," as appropriate.

1. All Eskimos like pie.
   A) If someone likes pie, he is an Eskimo.
   B) If someone is not an Eskimo, he likes pie.
   C) A person who does not like pie is not an Eskimo.

2. If you live in Atlantis, then you need a snorkel.
   A) If you do not live in Atlantis, then you do not need a snorkel.
   B) If you need a snorkel, then you live in Atlantis.
   C) If you do not need a snorkel, then you do not live in Atlantis.

Write the indicated statement for each of the following sentences.

3. If the moon is full, the vampires are out. (Converse)

4. If a giraffe has a sore throat, then gargling doesn't help much. (Contrapositive)

5. If we have been receiving signals from Jupiter, it may not be wise to go there. (Inverse)

6. You cannot comprehend Geometry, if you do not know how to reason deductively. (Converse)*

kf

LESSON 2.3

NAME _____ DATE _____

# Practice C

For use with pages 87–95

**Using $p$ and $q$ below, write the symbolic statement in words. Assume $p$ and $q$ are true. Decide if each symbolic statement is *true* or *false*.**

$p$: The value of $x$ is $-4$. $q$: $3x + 2 = -10$

1. $\sim p$
2. $\sim q$
3. $q \rightarrow p$
4. $\sim q \rightarrow \sim p$
5. $p \rightarrow q$
6. $\sim p \rightarrow \sim q$

**Determine if statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write invalid.**

7. (1) If you are a student, then you have lots of homework.
   (2) If you have lots of homework, then you have no social life.
   (3) If you are a student, then you have no social life.
8. (1) If the lines are perpendicular, then they intersect to form a right angle.
   (2) Line $l$ is perpendicular to line $m$.
   (3) Lines $l$ and $m$ intersect to form a right angle.
9. (1) Vertical angles are congruent.
   (2) $\angle A \cong \angle B$
   (3) $\angle A$ and $\angle B$ are vertical angles.
10. (1) If the quadrilateral is a square, then it has four right angles.
    (2) Quadrilateral $ABCD$ has four right angles.
    (3) Quadrilateral $ABCD$ is a square.
11. (1) If you practice your clarinet, then you will improve.
    (2) Kevin practices his clarinet.
    (3) Kevin's clarinet playing improves.
12. (1) If $m\angle 2 \neq 40°$, then $m\angle 3 \neq 140°$.
    (2) If $m\angle 3 \neq 140°$, the $m\angle 4 \neq 40°$.
    (3) If $m\angle 2 \neq 40°$, then $m\angle 4 \neq 40°$.

**In Exercises 13–17, assume the following statements are true.**

- If I call the superintendent, then I must pay the rent. $(p \rightarrow q)$
- If the apartment ceiling is not leaking, then it is not raining. $(\sim r \rightarrow \sim s)$
- I will call the superintendent if the apartment ceiling leaks. $(r \rightarrow p)$
- If it is not raining, then it is not Tuesday. $(\sim s \rightarrow \sim t)$

13. Write the contrapositive of the second statement.
14. Write the contrapositive of the fourth statement.
15. Write the premises in an order which makes a valid argument.
16. It is Tuesday. Can you conclude that you must pay the rent? Explain.
17. It is not Tuesday. Can you conclude you did not pay the rent? Explain.

LESSON 2.1

Name _____ Date _____

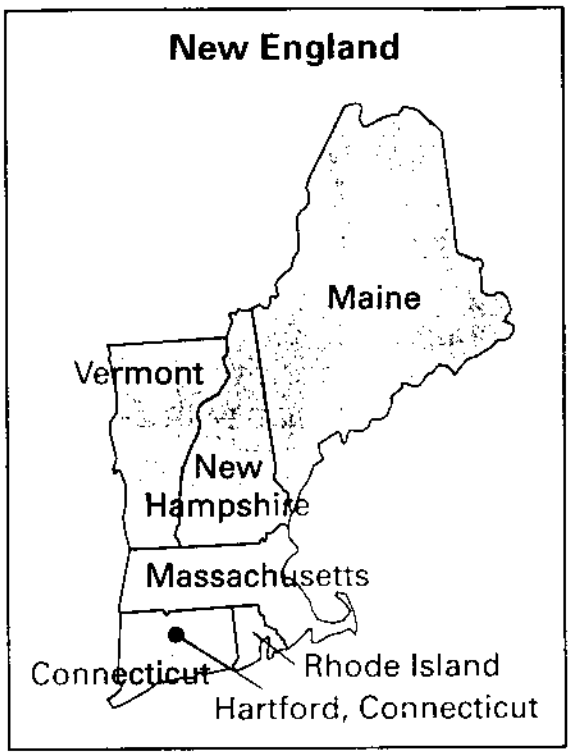
Available as a transparency

# Visual Approach Lesson Opener

For use with pages 71–78

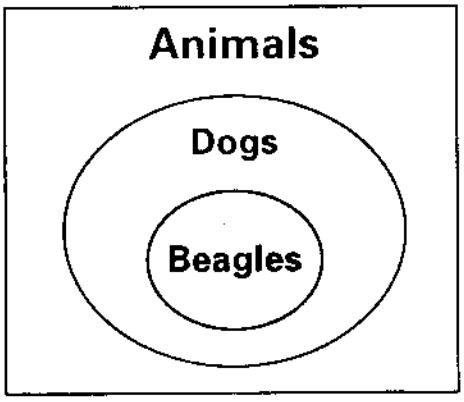
Lesson 2.1

**Use the map at the right to determine whether the statement is *true* or *false*. Explain why your answer is correct.**




1. If you are in Massachusetts, then you are in New England.
2. If you are in New England, then you are in Massachusetts.
3. If you are in Hartford, then you are in Connecticut.
4. If you are in Connecticut, then you are in Hartford.

**Use the Venn diagram at the right to determine whether the statement is *true* or *false*. Explain why your answer is correct.**




5. If an animal is a beagle, then it is a dog.
6. If an animal is a dog, then it is a beagle.
7. All animals are dogs.
8. All dogs are animals.
9. Draw a Venn diagram to show that all robins are birds, but not all birds are robins. Explain why your Venn diagram clearly shows this is true.