

10-3-2006

## Using Deductive Reasoning

Miriam Santana-Valadez  
*The College at Brockport*

Follow this and additional works at: [http://digitalcommons.brockport.edu/cmst\\_lessonplans](http://digitalcommons.brockport.edu/cmst_lessonplans)

 Part of the [Physical Sciences and Mathematics Commons](#), and the [Science and Mathematics Education Commons](#)

---

### Repository Citation

Santana-Valadez, Miriam, "Using Deductive Reasoning" (2006). *Lesson Plans*. 306.  
[http://digitalcommons.brockport.edu/cmst\\_lessonplans/306](http://digitalcommons.brockport.edu/cmst_lessonplans/306)

This Lesson Plan is brought to you for free and open access by the CMST Institute at Digital Commons @Brockport. It has been accepted for inclusion in Lesson Plans by an authorized administrator of Digital Commons @Brockport. For more information, please contact [kmyers@brockport.edu](mailto:kmyers@brockport.edu).

# Unit 1

---

## 1.7 Using Deductive Reasoning

## Objective 1.7

---

- Students will use deductive reasoning to solve problems and verify conjectures.

## Essential Question

How are certain pairs of angles related?

---

# DO NOW

---

Copies

1.6 Mixed Exercises

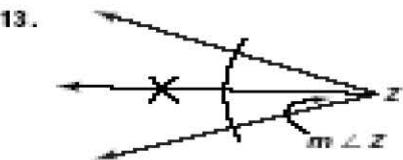
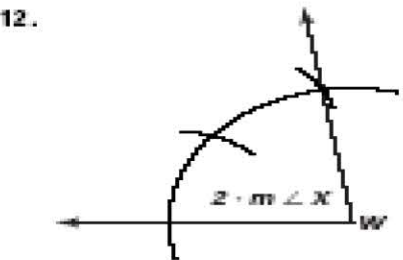
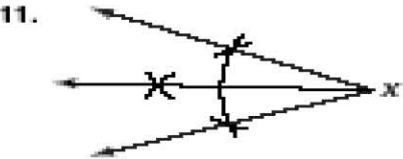
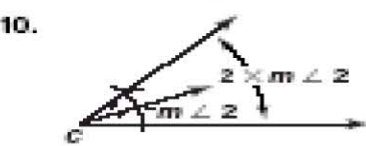
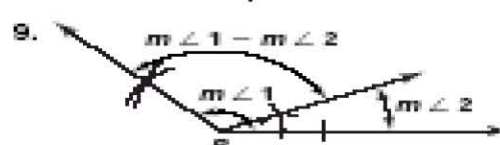
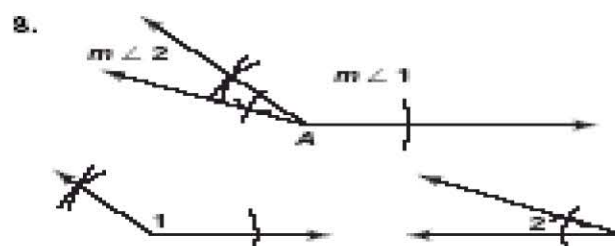
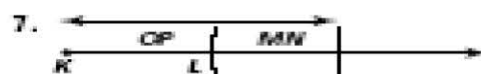
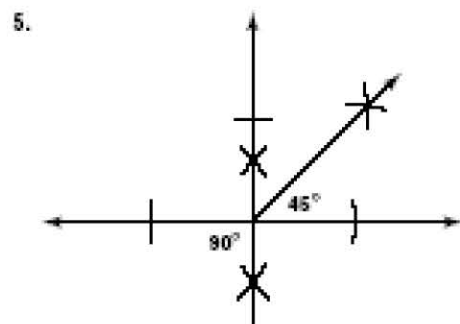
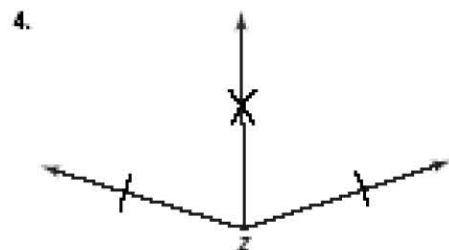
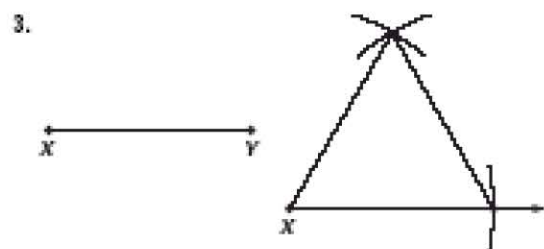
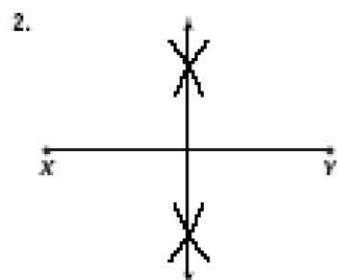
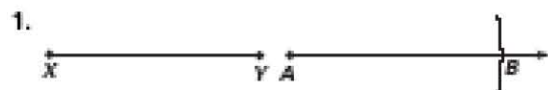
1-4

11-13

14-20

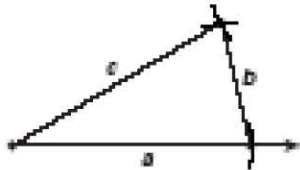
---

### Practice 1-6: Mixed Exercises

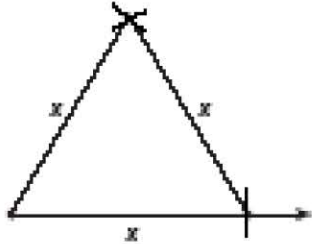


### Practice 1-6: Example Exercises

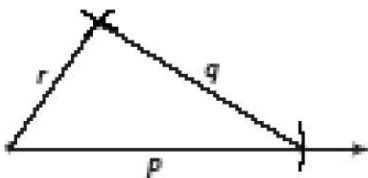
1.



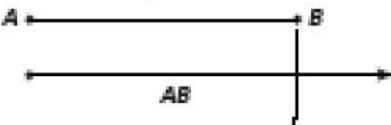
2.



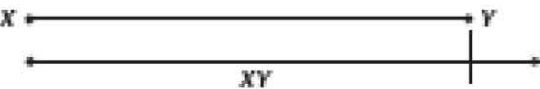
3.



4.



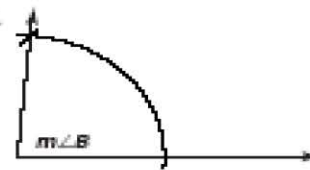
5.



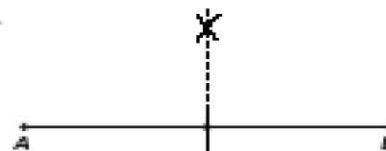
6.



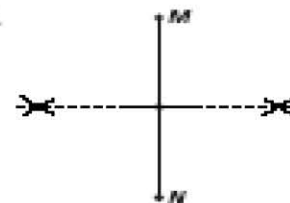
7.



8.



9.



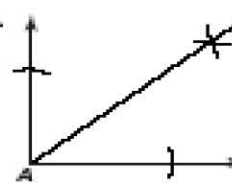
10.



11.



12.



# Vocabulary

---

- **Deductive Reasoning:** is a process of reasoning logically from given facts to a conclusion.
-

# Properties of Equality and Real Numbers

---

## **Addition Property**

If  $a = b$ , then  $a + c = b + c$

## **Subtraction Property**

If  $a = b$ , then  $a - c = b - c$

## **Multiplication Property**

If  $a = b$ , then  $a \cdot c = b \cdot c$

## **Division Property**

If  $a = b$ , then  $\frac{a}{c} = \frac{b}{c}$  ( $c \neq 0$ )

## **Substitution Property**

If  $a = b$ , then  $b$  can replace  $a$  in any expression

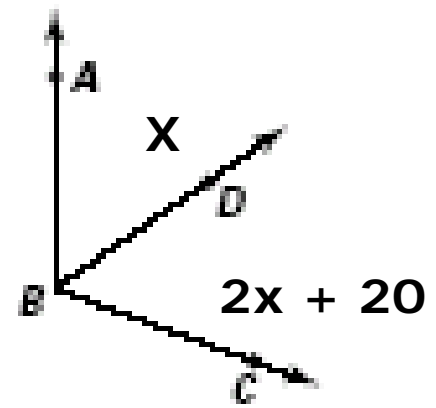
## **Distributive Property**

$a(b+c) = ab + ac$

---



# Example 1



$m\angle ABC = 140$ , Solve for  $x$  and justify each step

$$\angle ABD + \angle DBC = \angle ABC \quad \text{Angle addition Postulate}$$

$$x + (2x + 20) = 140 \quad \text{Substitution}$$

$$3x = 120 \quad \text{Subtraction Property of Equality}$$

$$x = 40 \quad \text{Division Property of Equality}$$

# Properties of Congruence

---

## □ Reflexive Property

$$AB \cong AB$$

## □ Symmetric Property

If  $AB \cong CD$ , then  $CD \cong AB$

If  $\angle A \cong \angle B$ , then  $\angle B \cong \angle A$

## □ Transitive Property

If  $AB \cong CD$  and  $CD \cong EF$ , then  $AB \cong EF$

If  $\angle A \cong \angle B$  and  $\angle B \cong \angle C$ , then  $\angle A \cong \angle C$

---

# Example 1 (b)

---

Name the property of equality or congruence illustrated

a.  $\angle k = \angle k$

b. If  $2x - 8 = 10$ , then  $2x = 18$

c. If  $RS = TW$  and  $TW = PQ$  then  
 $RS = PQ$

d. If  $\angle A = \angle B$  then  $\angle B = \angle A$

---

# Angles Pairs

---

- There are pairs of angles with special names. The most important are
    - a. Vertical angles
    - b. Adjacent angles
    - c. Complementary angles
    - d. Supplementary angles
-

# Theorems

---

## 1.1 Vertical Angles Theorem

Vertical angles are congruent

## 1.2. Congruent Supplements Theorem

If two angles are supplements of congruent angles (or of the same angle), then the two angles are congruent.

## 1.3 Congruent Complements Theorem

If two angles are complements of congruent angles (or the same angle), then the two angles are congruent.

\*Problems pages 50 and 51 TE

---

---

□ TOD

Work book

Practice 1.7 Example Exercises (odds)

□ Homework

Practice 1.7 Example Exercises (even)

---

# 1.7 Practice

---

## Practice 1-7: Example Exercises

1. 15   2. 18   3. 15   4. 45   5. 11   6.  $x = 6, y = 150$

7.  $x = 8, y = 40$    8.  $\angle 1$  and  $\angle 3, \angle 2$  and  $\angle 4$    9. any two of the following pairs:  $\angle 1 + \angle 2; \angle 2 + \angle 3; \angle 3 + \angle 4; \angle 4 + \angle 1$ .   10. angles 1 and 3, angles 2 and 4   11. 180

12. supplementary   13. 180   14. supplementary

15. Let  $m\angle 1 = m\angle 3 = x$ . Then  $m\angle 2 = 180 - x$  and  $m\angle 4 = 180 - x$ . So  $m\angle 2 = m\angle 4$ .

# 1.7 Practice

---

## Practice 1-7: Mixed Exercises

1. 30 2. 15 3. 30 4. 6 5. 16 6. 9 7. false 8. true  
9. true 10. true 11. false 12. false 13. false 14. true  
15. true 16. false 17. false 18.  $m\angle PMO = 55$ ;  
 $m\angle PMQ = 125$ ;  $m\angle QMN = 55$  19.  $m\angle BOD =$   
 $m\angle COE = 90$ ;  $m\angle BOC = m\angle COD = 45$ ;  
 $m\angle AOB = m\angle DOE = 45$  20.  $m\angle BWC =$   
 $m\angle CWD$ ;  $m\angle ANB + m\angle BWC = 180$ ;  $m\angle CWD +$   
 $m\angle DNA = 180$ ;  $m\angle ANB = m\angle AND$