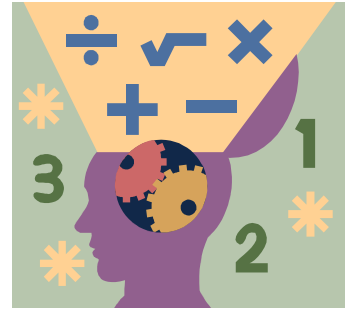


Algebra/Geometry Institute Summer 2010

Faculty Name: Rod Fullilove

School: Drew High School

Grade Level: 9-12 (Algebra I)



1 Teaching objective(s)

Given twelve problems on finding the area of parallelograms, rectangles, squares, rhombi, trapezoids, and triangles, students will answer with 75% accuracy.

2 Instructional Activities

Describe completely the class activities for your lesson.

Introduction:

The teacher will read the objective and competency from the overhead or

Chalkboard:

Competency 4 – Demonstrate and apply various formulas in problem solving Situations.

Objective 4a – Solve real-world problems involving formulas for perimeter, area, distances, and rate. DOK 2

Activities:

Replicas of parallelograms, rectangles, squares, rhombi, trapezoids, and triangles will be distributed to half of the class, and the names of those figures will be distributed to the other half of the class (attachment #1). Students will be asked to find other students who have the name that matches the figure. This will determine the groups for the cooperative learning activities. (Rectangles and squares together), (Parallelograms and rhombi together), (triangles and trapezoids together)
Attachment #1

Each group will be asked to explain the reason(s) they grouped together. Following that discussion, the class will explore the definition for each figure.

- Quadrilateral – Closed four-sided figure with the sum of all the interior angles equal to 360° . (illustrate on overhead)
- Parallelogram - a quadrilateral that has opposite sides the same length (congruent), opposite sides parallel (what is parallel), and opposite interior angles measure the same (congruent).
- Rhombus – a parallelogram that has all four (4) sides the same length (congruent).

- d. Rectangle - a parallelogram that has each of its interior angles measure 90° .
- e. Square - a parallelogram that has four (4) sides of the same length (congruent) and each interior angle measures 90° .
- f. Trapezoid - a quadrilateral with one pair of parallel sides.
- g. Triangles – a closed geometric figure with three (3) sides and the sum of its interior angles is 180° .

Today we are going to explore the area of each of these figures.

Ask for a volunteer to give a definition of area (the space inside the figure)

Area of a figure measures the size of the region enclosed by the figure (the space inside the figure).

Ask the class if they know what the units will be for area? (square feet, square meters, etc.)

*Students will be given sketches of the different shapes, drawn on grid paper, (parallelogram, rectangle, ...) and: **Attachment #2**

1. asked to estimate the area for each figure
2. asked to count the number of total squares inside each figure
3. share their conclusions of the relationships between the area of the quadrilaterals and the length of each side

Explanation of formulas:

Ask students to draw conclusions for formulas to indicate area for each figure.

1. Square $A = s^2$ where s is the length of each side. (also $A = s \times s$)
2. Rectangle $A = l \times w$ where l represents the length of the rectangle and w represents the width of the rectangle.
3. Parallelogram $A = b \times h$ where b represents the base of the parallelogram and h represents the height of the parallelogram.
4. Rhombus $A = b \times h$ where b represents the base of the rhombus and h represents the height of the rhombus. (see any similarity here?)
5. Triangle $A = \frac{1}{2} b \times h$ where b represents the base and h represents the height of the triangle.
6. Trapezoid $A = \frac{1}{2} h (a + b)$ where h represents the height of the trapezoid, a represents the length of the parallel sides of the trapezoid, and b represents the length of the other parallel side of the triangle.

Index cards with various sizes of these figures will be distributed to each group, and students will be asked to find the area of each figure using the appropriate formula .
Attachment #1

Each group will choose a member to demonstrate one solution.

Exploring a special type of quadrilateral (trapezoid) and a triangle.

- a. Distribute drawings of a parallelogram and trapezoids on grid paper:
Attachment #2**
- b. Demonstrate conversion of a parallelogram into a rectangle by cutting off one corner and placing it on the opposite side (what is formed?) count the squares. What does this indicate? (area of a parallelogram base = b , and height = h is the same as the area of a rectangle with length = b and width = h). Ask for volunteer to demonstrate the concept on the overhead or board.**
- c. Demonstrate conversion of trapezoid into a parallelogram (2 identical trapezoids, one turned upside down and placed along side the other). Ask for volunteer to identify the resulting figure. Relate this figure to finding the area of a parallelogram. Is it possible to count all the squares to determine the area in this trapezoid?**

Summary and conclusion:

1. Ask students to identify the names of the types of geometric figures studied in this lesson.
2. Ask the students to define area.
3. Ask different students to state the formula for each figure studied in this lesson.
4. Ask another student to give some examples of units to measure area.
5. Distribute Formula Sheet Attachment # 3
6. Question and answer

3 Materials and Resources

Identify various materials and equipment needed for lesson activities. Provide complete references (include textbook and additional resources)

- a. Overhead projector
- b. Transparent shapes
- c. Scissors
- d. Index cards with various sizes of rectangles, squares, parallelograms, rhombi, triangles, trapezoids with measurements for length width, base and height respectively, provided for appropriate figures

- e. Individual shapes of parallelograms, rectangles, squares, rhombi, triangles, and trapezoids drawn on grid paper
- f. The names of each of the figures studied in this lesson on separate slips of paper
- g. Formula sheet for area of the polygons studied in this lesson

4 Assessment

Describe completely the assessment to be used for this lesson.

Students will work problems to 75% proficiency from 12 problems on area of parallelograms, rectangles, squares, rhombi, triangles, trapezoids. Six problems will contain a sentence describing the figure with measurements, and six problems will be drawings of each of the figures provided with the appropriate measurements.

(See Attached assessment)

I referenced no outside sources for this lesson plan.

AREA ASSESSMENT

Work the following problems and describe the method you used to arrive at your answer.

1. What is the area of a rectangle having a length of 6 centimeters and a width of 4 centimeters?

2. What is the area of a parallelogram having a base length of 20 feet and a corresponding height of 7 feet?

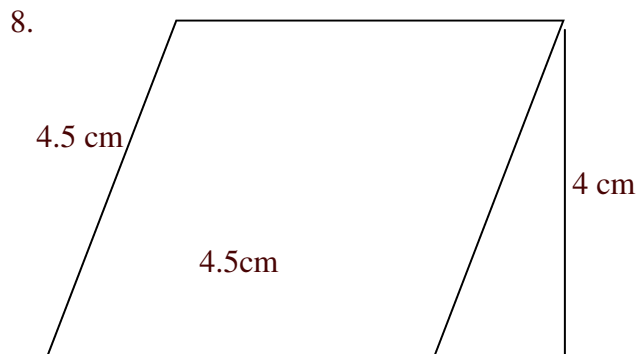
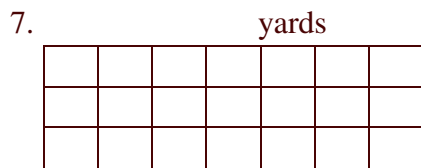
3. What is the area of a trapezoid having bases of 12 meters and 8 meters, and a height of 5 meters?

4. What is the area of a triangle having a base of 5.2 inches and a height of 4.2 inches?

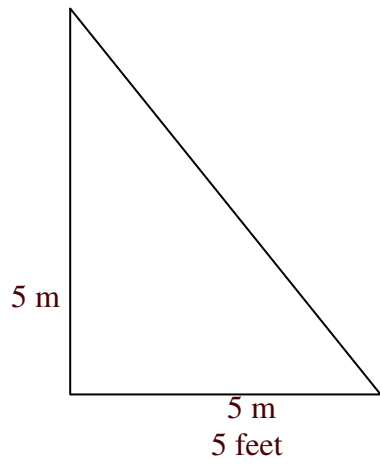
5. What is the area of a square having a side length of 4 yards?

6. What is the area of a rhombus having a side length of 9 inches and a height of 7 inches?

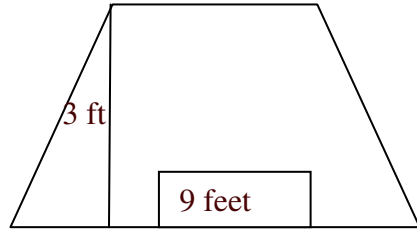
Find the area of each of the following figures.



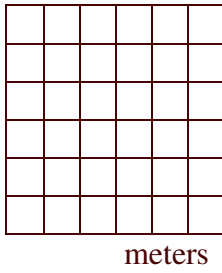
9.



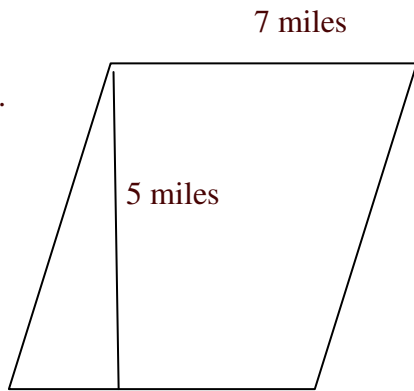
10.



11.



12.



**AREA
Assessment
Answer Key**

1. 24 cm²

2. 140 ft²

3. 50 m²

4. 10.92 in²

5. 16 yd²

6. 63 in²

7. 21 yd²

8. 18 cm²

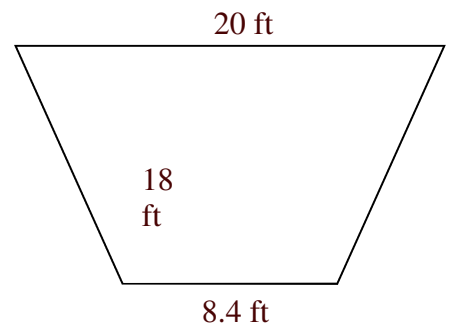
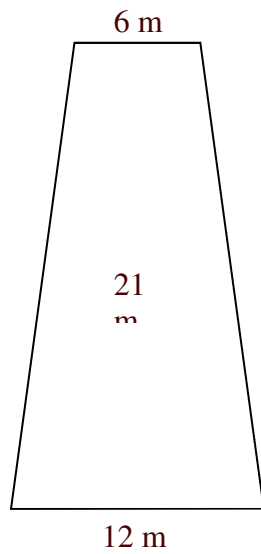
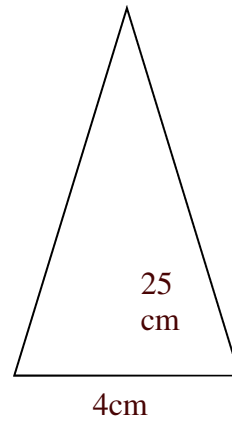
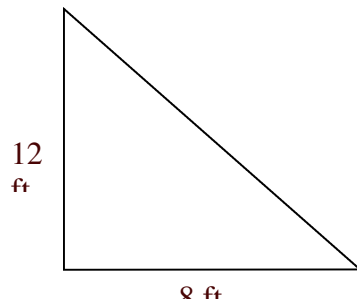
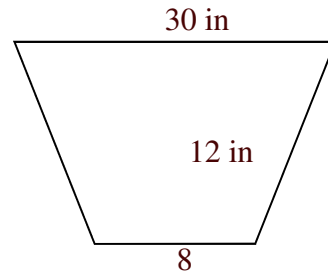
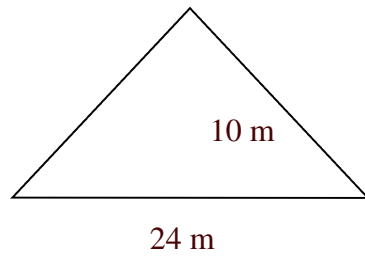
9. 12.5 m²

10. 21 ft²

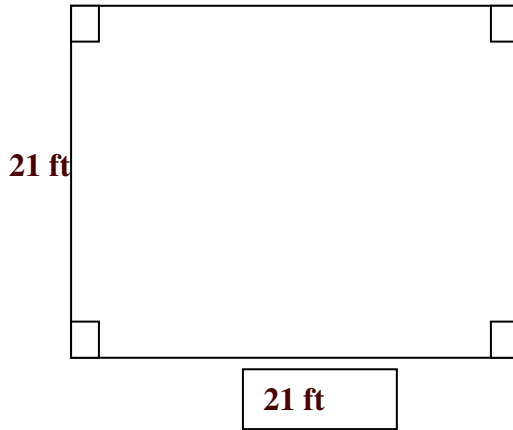
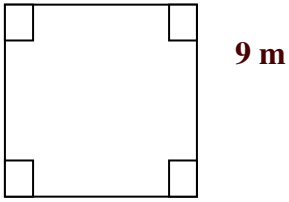
11. 36 m²

12. 35 mi²

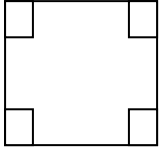
Attachment #1



Attachment #1
9m



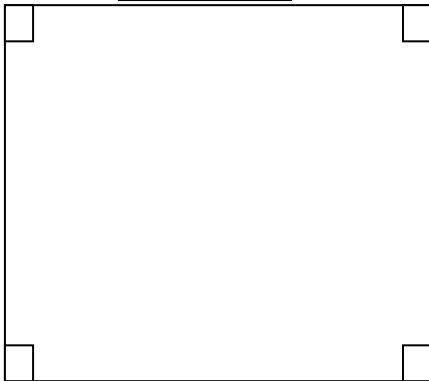
2 in



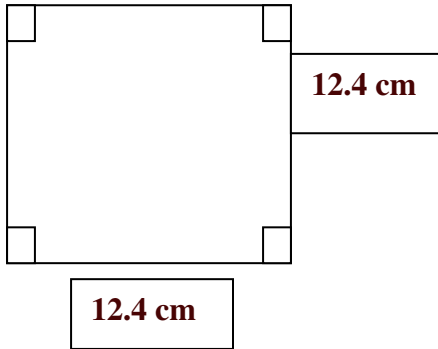
2 in

21 ft

50 mm



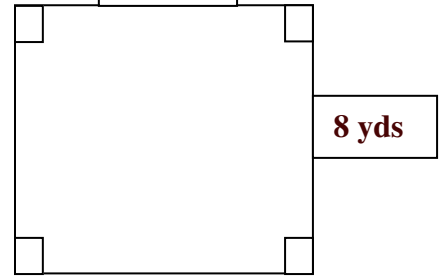
50 mm



12.4 cm

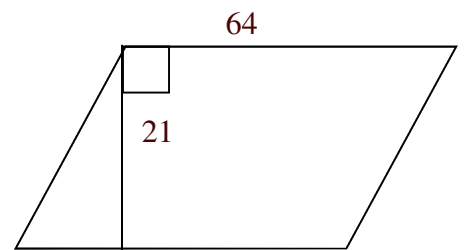
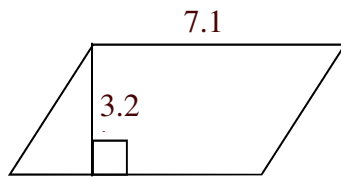
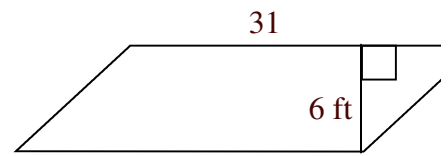
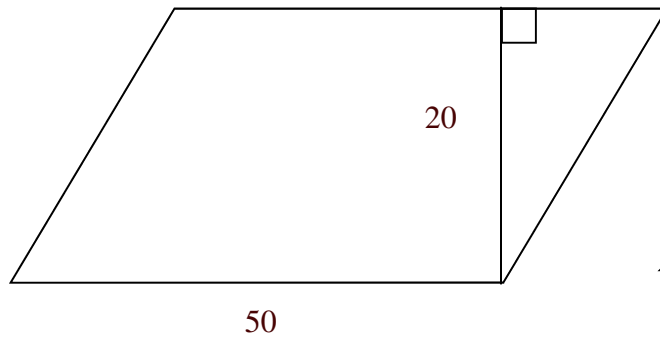
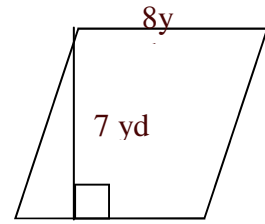
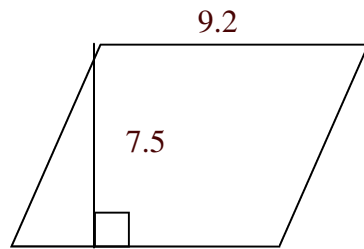
12.4 cm

8 yds



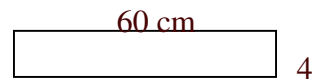
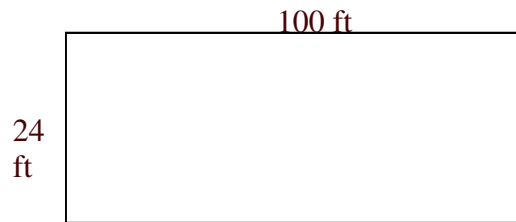
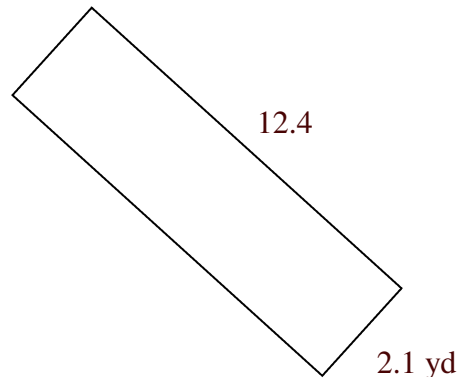
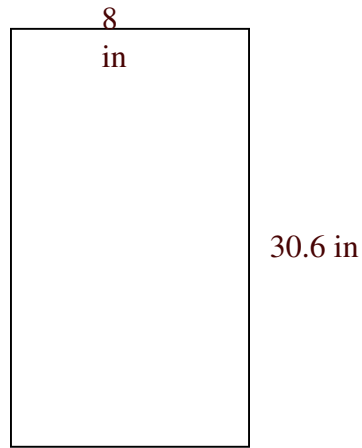
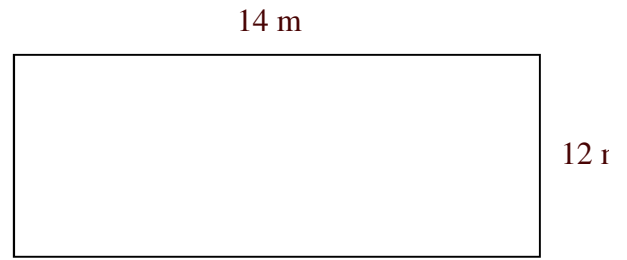
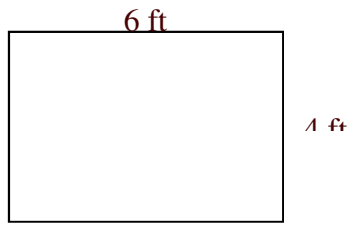
8 yds

Attachment #1

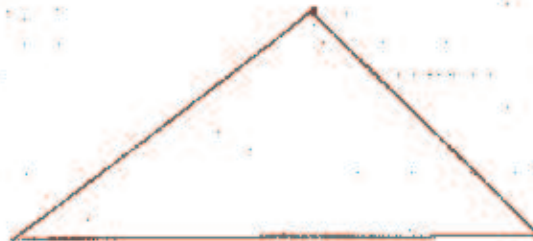
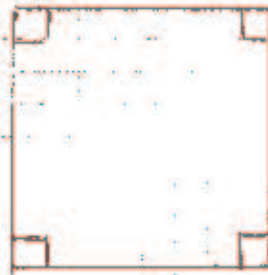
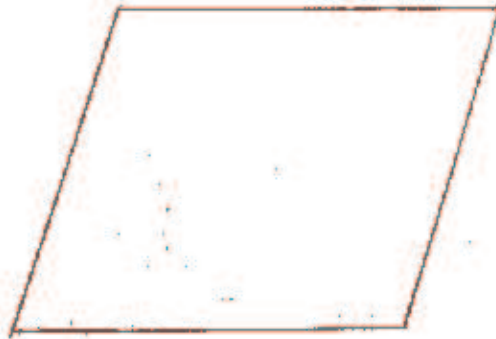


Attachment #1

Each of the following figures is a



Attachment #2



Attachment #3

A = L x W
width

L represents length **w represents**

A = s²
square

s represents the length of one side of the

A = b x h
height

b represents the base **h represents the**

A = 1/2 b x h
height

b represents the base **h represents the**

A = 1/2 h (a + b)
parallel side

h represents height, a represents one

B represents the other parallel side