DSU Algebra/Geometry Summer Institute

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R. L. Merritt Middle School
Sixth Grade

1. Teaching Objective(s)

The students will learn how to use appropriate tools/units in computing the area of different figures.
4 e Calculate the perimeter and area of parallelograms and triangles
4 f Calculate the circumference and area of a circle with and without manipulative

2. Instructional Activities

Warm-up exercise**:** The students will look at figure 1 on the overhead screen and determine if the land distribution between the two brothers is fair. The students will also make suggestions of the best and fairest way to divide the land.

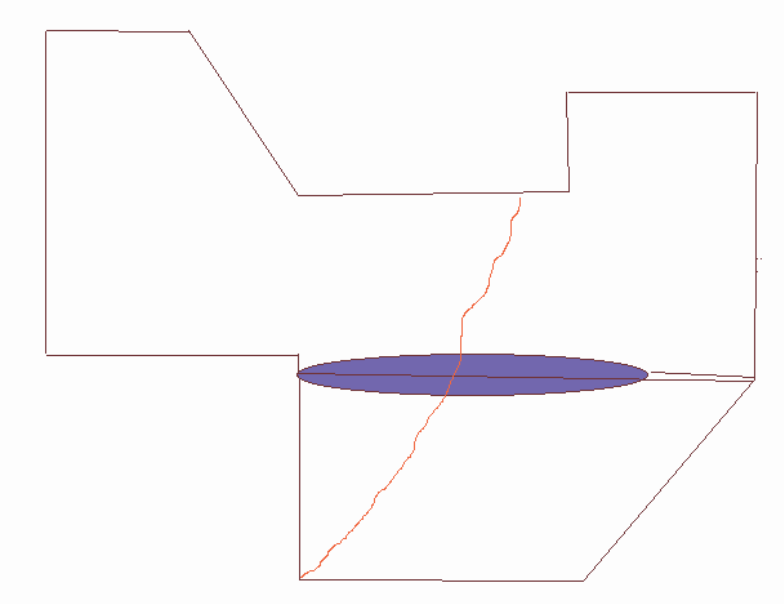


Figure 1

5 minutes

The teacher will:

- Review calculating areas of rectangles, parallelograms, and triangles.
  - Area of a rectangle is defined as l x w (l = length; w=*width*)
  - Area of a parallelogram is defined as b x h (b=base; h=height)
  - Area of a triangle is as $\frac{1}{2}b \bullet h$ (● means multiplication)

- Students will be asked to identify any of these shapes in Fig. 1. The teacher will ask students to come up with other methods that can be used to divide the

land. An example will be displayed by the teacher of using a grid over the map of the land. This activity will illustrate the number of squares in each division. (Fig 1a)

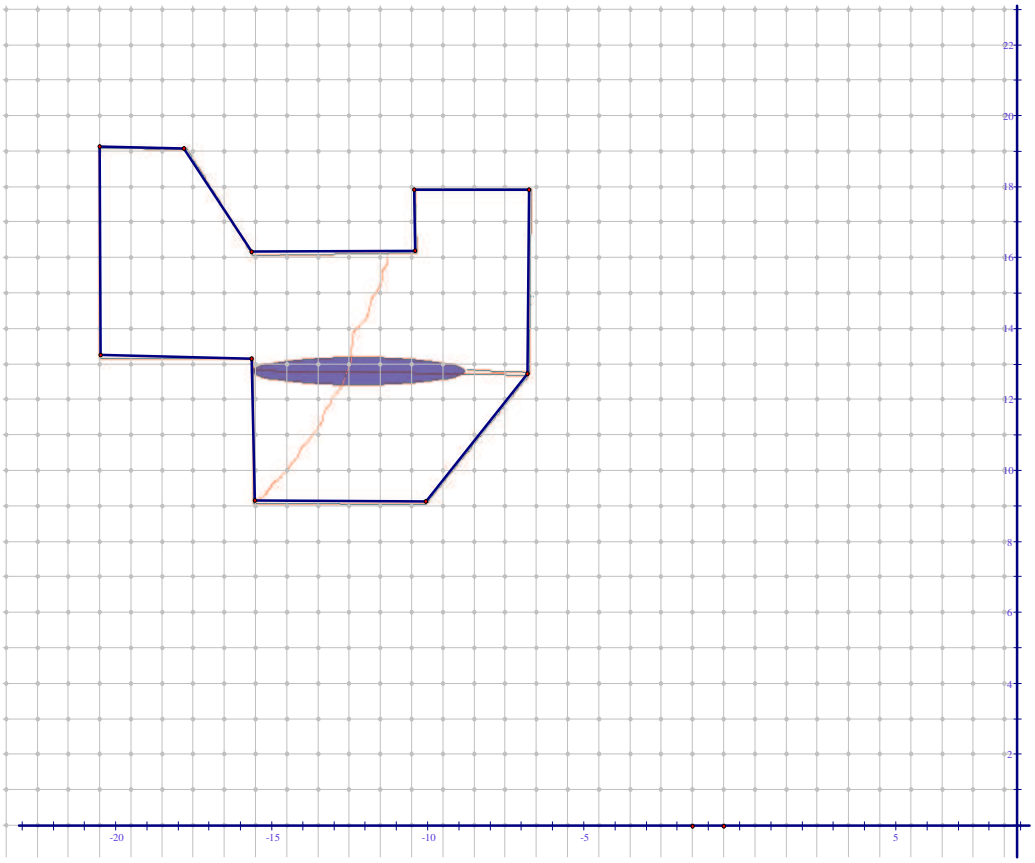
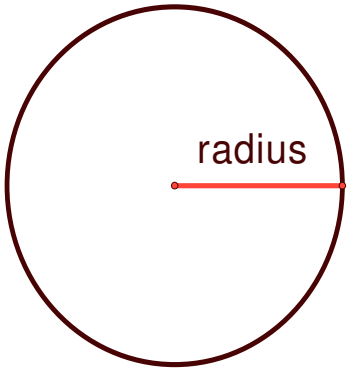


Fig. 1a

The teacher will introduce the area of a circle to the class. The area of the circle is defined as the product of π and the radius squared ($A = \pi r^2$). The fraction circles manipulatives will be introduced at this time. The purpose of the manipulatives is to illustrate π, as a ratio of the diameter to the circumference.



The teacher will:

— Divide the class into groups of 3s or 4s
— Demonstrate the relation of diameter to circumference (Purpose to give a demonstration of the value of π)
    - Ask students to use a string to measure the diameter of a semi circle ($\frac{1}{2}$ fraction circle pieces)
    - Use the string to measure the circumference.
    - Write in their note books the ratio of the circumference to the diameter

—Observe and guide students during group work

10 minutes

The students will:

Use the $\frac{1}{10}$ fraction pieces to create a parallelogram as shown below (Fig. 2)

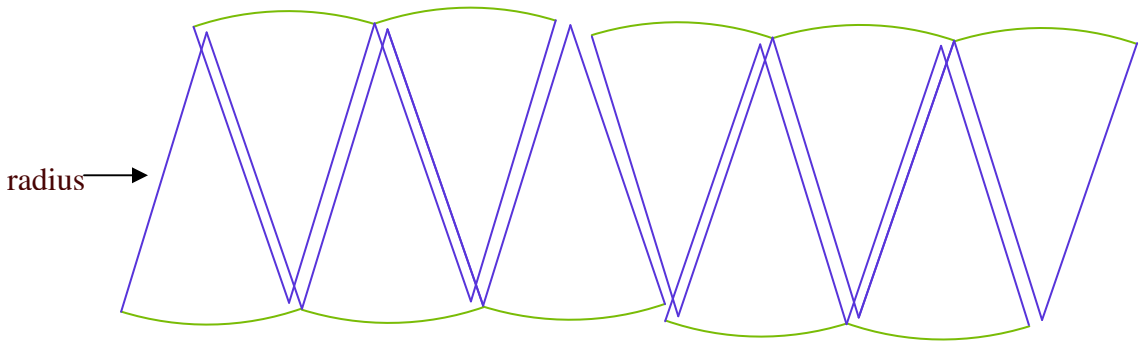


Fig. 2

— Use different fraction circles sizes ($\frac{1}{2}, \frac{1}{4}, \frac{1}{10}, \frac{1}{12}$) , to build parallelograms and compare.
— Write their observations and any questions in their note books
— Present in groups their solutions and observations to the class

25 minutes

Closure

The teacher will summarize the lesson by referring to Fig. 2. The shape in figure is that of a parallelogram. The base of this parallelogram is πr (half of the circumference of a circle) and the height is r. Using the formula for the parallelogram (base x height), the area in Fig. 2 becomes $\pi r \bullet r$. Simplifying we get πr^2**.** The conclusion that can be reached is that the area of the circle can be related to the area of the parallelogram.

3. Materials and Resources

Manipulatives – Circle fraction pieces ($\frac{1}{2}, \frac{1}{4}, \frac{1}{10}, \frac{1}{12}$)
Grid Paper, Pencil, Rulers, Drawn and cut Circles (paper)
Text Book: **Mathematics Applications and Connections Course 2**
(Glencoe Macmillan/McGraw-Hill)

4. **Assessment**

The teacher will observe students participation in-group activities.
Students will submit their observation in writing.
Students will work problems on area of a circle by completing the following table. (USE 3.14 FOR π).

Radius	Diameter	Area of circle	How you solved the problem
7ft			
	24mm		
		$28.26cm^2$	
12cm			