



*Enrichment*

**Lesson:** area and perimeter of complex shapes

**Sixth Grade Objective:** 2.02 Solve problems involving perimeter/circumference and area of plane figures. 3.02 Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationship between them.

*Review*

**Vocabulary:**

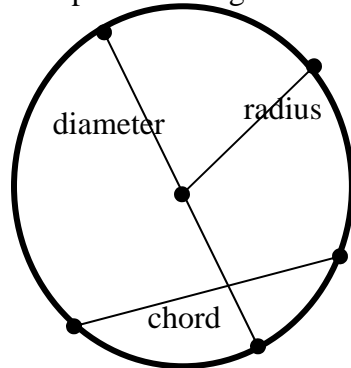
area- The measure of the region that is inside a closed plane figure.

circumference: the distance around the outside of the circle

chord- a line segment which has its end points on the edge of the circle

radius- the distance from the center of the circle to the outside edge

diameter- a chord that passes through the middle of the circle



**Formulas for Circles:**

Area of a circle= radius x radius x  $\pi$

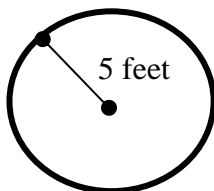
Circumference = diameter x  $\pi$

Diameter= 2 x radius

Radius=  $\frac{1}{2}$  of the diameter

Volume:

Using these formulas we can determine the diameter, radius, circumference and area of the following circle. Assume  $\pi= 3.14$



radius= 5 feet

circumference=  $d \times 3.14$

$c= 10 \times 3.14$

$c= 31.4$  feet

area=  $5 \times 5 \times 3.14$

$a= 78.5$  square feet

diameter=  $r \times 2$

$d= 5 \times 2$

d= 10 feet

**Formulas for:**

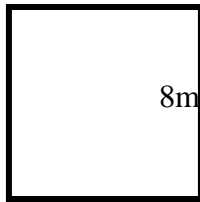
rectangles, square, parallelograms

- Perimeter= side + side + side + side or  $P= 2 (\text{height} + \text{width})$
- Area= base x height

triangles

- Area=  $\frac{1}{2}$  base x height
- Perimeter= side + side + side

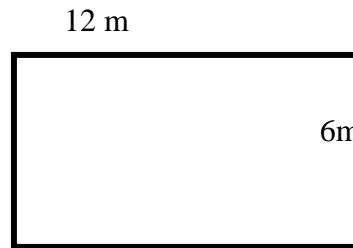
**Square**



Area= length x width  
Area=  $8 \times 8$   
A= 64 square meters

Perimeter=  $s + s + s + s$   
Perimeter=  $8 + 8 + 8 + 8$   
*or  $8 \times 4$*   
P= 32 meters

**Rectangle**



Area= length x width  
A=  $6 \times 12$   
A= 72square meters

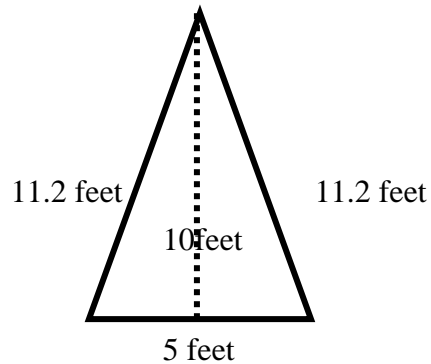
Perimeter=  $s + s + s + s$   
P=  $6 + 12 + 6 + 12$   
*or  $2(6 + 13)$*   
P= 36 meters

**Triangle**

Area=  $\frac{1}{2}$  base x height  
Perimeter=  $s + s + s$   
  
A=  $\frac{1}{2} \times 5 \times 10$   
A= 25 square feet

P=  $s + s + s$

P=  $11.2 + 11.2 + 5$   
P= 27.4 feet



**Lesson:**

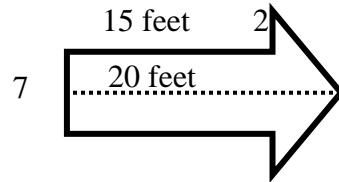
**When calculating the area of a more complex figure you need to break the figure down into more manageable pieces.**

1. a. the triangle=

$$A = \frac{1}{2} \times \text{base} \times \text{height}$$

$$A = \frac{1}{2} \times 11 \times 5$$

$$A = 27.5 \text{ square feet}$$



b. the rectangle=

$$A = \text{length} \times \text{width}$$

$$A = 15 \times 7$$

$$A = 105 \text{ square feet}$$

c. the two figures combined=

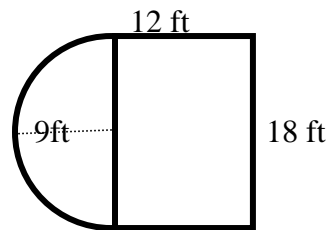
$$A = 27.5 + 105$$

$$A = 132.5 \text{ square feet}$$

**Try these on your own!**

**Find the area. Use 3.14 for  $\pi$ .**

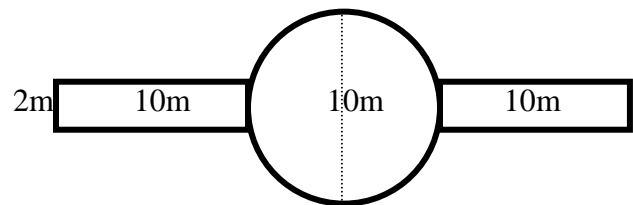
1. a. the rectangle=\_\_\_\_\_



b. the semicircle= \_\_\_\_\_

c. the two figures combined=\_\_\_\_\_

2. a. rectangle 1=\_\_\_\_\_

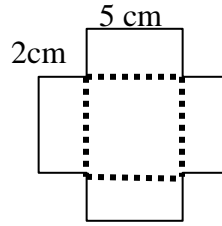


b. rectangle 2=\_\_\_\_\_

c. circle =\_\_\_\_\_

d. the three figures combined=\_\_\_\_\_

3. a. rectangle 1=  
 b. rectangle 2=  
 c. rectangle 3=  
 d. rectangle 4=  
 e. square=  
 f. all figures combined=



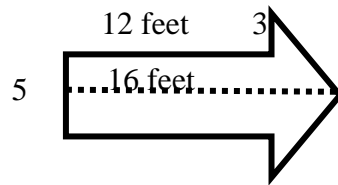
**Check your answers**

- |                       |                        |                    |
|-----------------------|------------------------|--------------------|
| 1. a. 216 square feet | 2. a. 20 square meters | 3. a. 10 square cm |
| b. 127.17 square feet | b. 20 square meters    | b. 10 square cm    |
| c. 343.17 square feet | c. 78.5 square meters  | c. 10 square cm    |
|                       | d. 118.5 square meters | d. 10 square cm    |
|                       |                        | e. 25 square cm    |
|                       |                        | f. 65 square cm    |

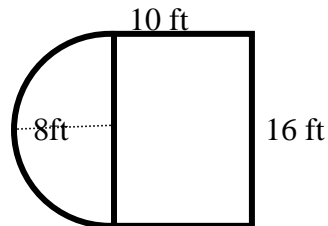
**Quiz Yourself**

**Find the area. Use 3.14 for  $\pi$**

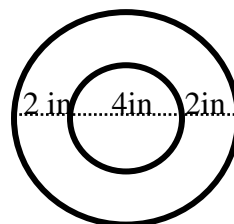
1. a. the triangle=  
 A=  
 b. the rectangle=  
 A  
 c. the two figures combined=  
 A=



2. a. the rectangle= \_\_\_\_\_  
 b. the semicircle= \_\_\_\_\_  
 c. the two figures combined= \_\_\_\_\_



3. find the area of the donut  
 a. entire circle= \_\_\_\_\_  
 b. small circle= \_\_\_\_\_



c. entire circle minus center= \_\_\_\_\_

**Check Your Answers**

1. a. 22 square feet  
b. 60 square feet  
c. 82 square feet

2. a. 60 square feet  
b. 100.48 square feet  
c. 160.48 square feet

3. a. 50.24 sq. inches  
b. 12.56 sq. inches  
c. 37.68 sq. inches