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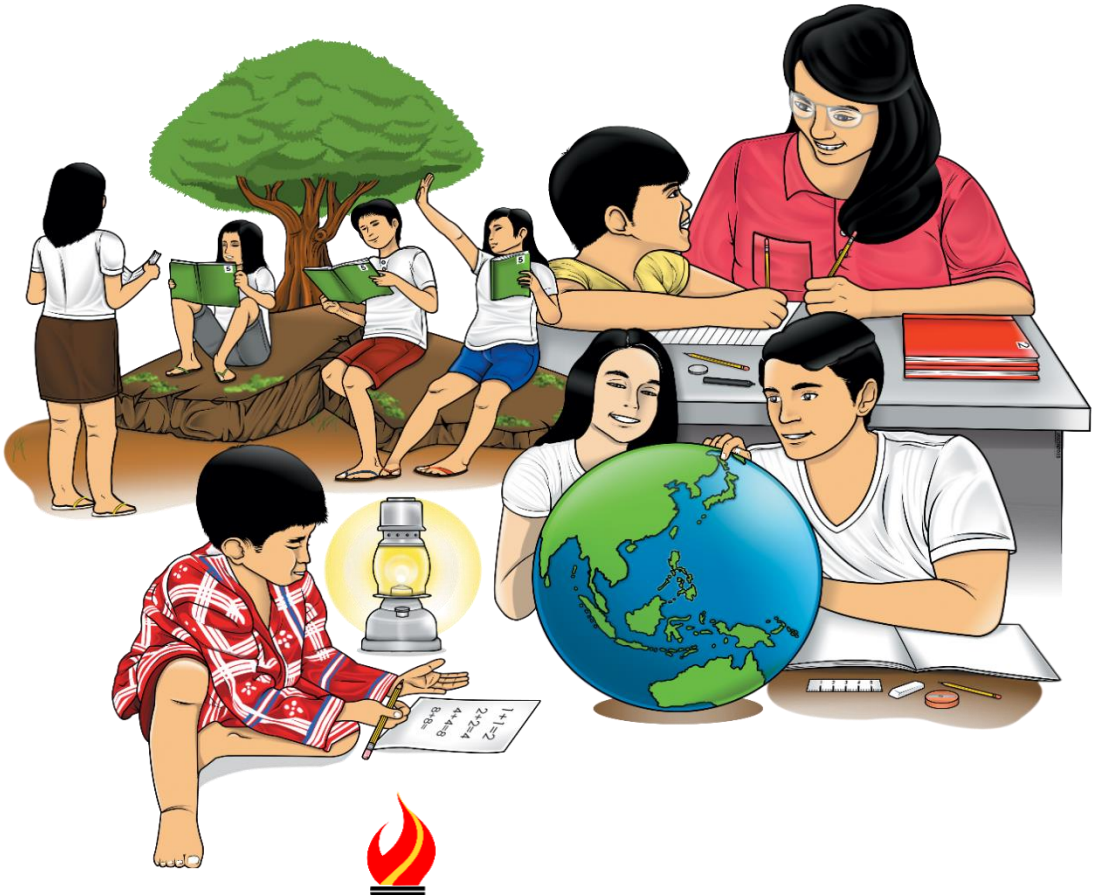
Mathematics

Quarter 3 – Module 6: Area of Composite Figures



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Mathematics

Quarter 3 – Module 6:
Area of Composite Figures

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It discusses the process in finding the area of a composite figures and the process on how to solve problems involving area of composite figures. It is here to help you master the skills in solving area of composite figures as well as solving word problems. The scope of this module allows you to use it in many different learning situations. The language used recognizes your diverse vocabulary level. The lessons are arranged to follow the standard sequence of your course. However, the order in which you read them can be changed to match with the textbook you are now using.

The module is divided into two lessons, namely:

- Lesson 1 – Finding the area of composite figures formed by any two or more of the following: square, rectangle, circle and semi-circle
- Lesson 2 – Solving routine and non-routine problems involving area of composite figures formed by any two or more of the following triangle, square, rectangle, circle and semi-circle

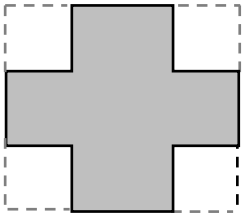
After going through this module, you are expected to:

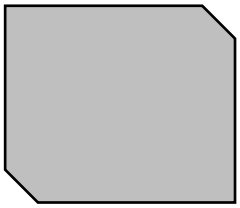
1. find the area of composite figures formed by any two or more of the following: triangle, square, rectangle, circle and semi – circle (M6ME-IIIh-89) and
2. solve routine and non-routine problems involving area of composite figures formed by any two or more of the following: triangle, square, rectangle, circle and semi-circle. (M6ME-III-90)

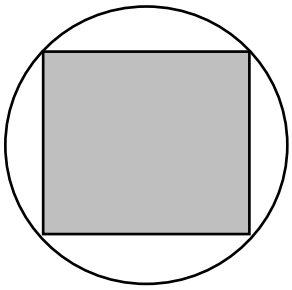
What I Know

Before you start studying this module, take this simple test first to find out how much you already know about the topics to be discussed.

A. Write the letter of the composite figures on your answer sheet.

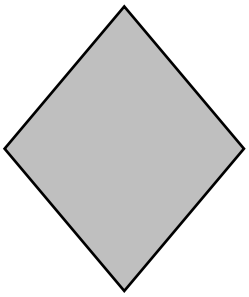
a. 

b. 

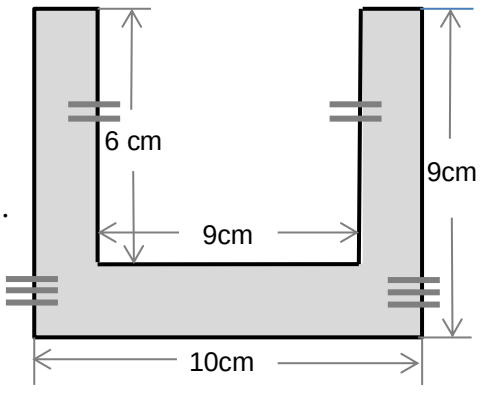
c. 

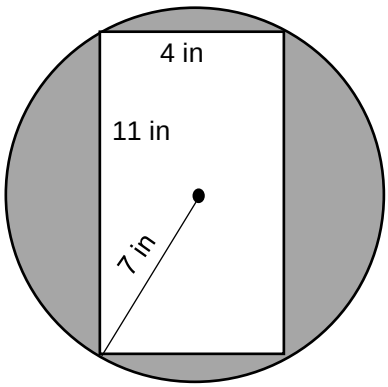
d. 

e. 

f. 

B. Find the area of the shaded part. Equal number of tick marks are placed to indicate equal measures of parts of the figures.

1. 

2. 

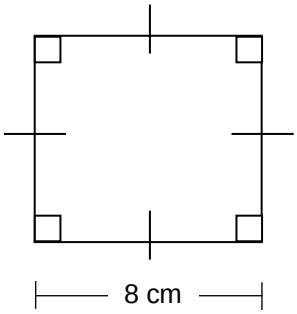
Lesson 1
Area of Composite Figures

In this lesson you will learn how to find the area of composite figures formed by any two or more of the following: triangle, square, rectangle, circle and semi-circle. Take note that illustrations used in this module are not scaled.

What's In

Find the area of the following figures.

1.



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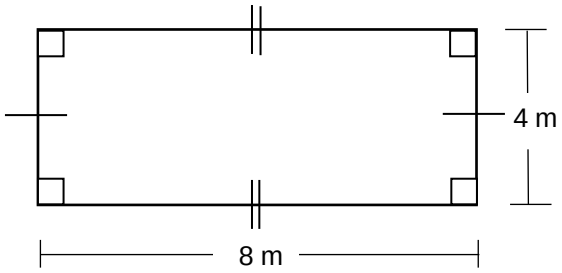

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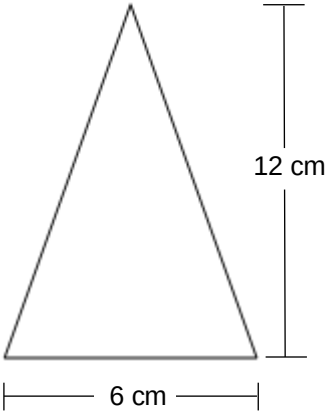

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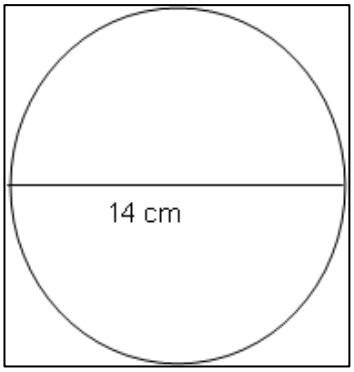
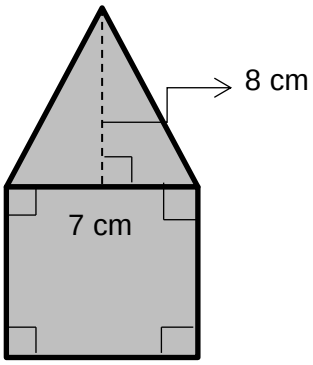


What's New

Look at the figure below.



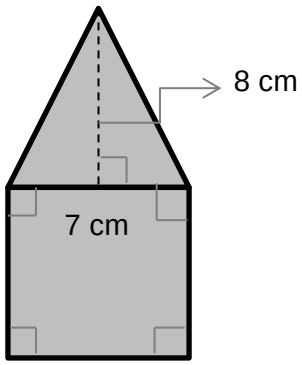
- How many shapes are there?
  - There are two shapes in the figure.
- What are the shapes in the figure?
  - The shapes in the figure are square and triangle.

This is an example of a composite figure. **Composite figures** are figures that can be segmented into two or more of the basic shape.

Can you find the area of the shaded region?

What is It

To find the area of each shaded region, we will consider that all angles marked with perpendicularity symbol (⌐) are right angles.



We can separate the figures into two: a triangle and a square. Now, let us find the area of each figure.

Solution:

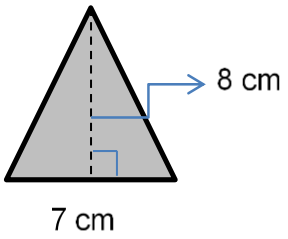
Area of Triangle

$A = \frac{1}{2}$ x b x h

$= \frac{1}{2}$ x 7 cm x 8 cm

$= \frac{1}{2}$ x 56 cm^2

A = 28 cm^2

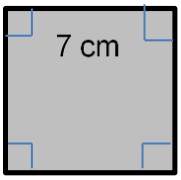


Area of Square

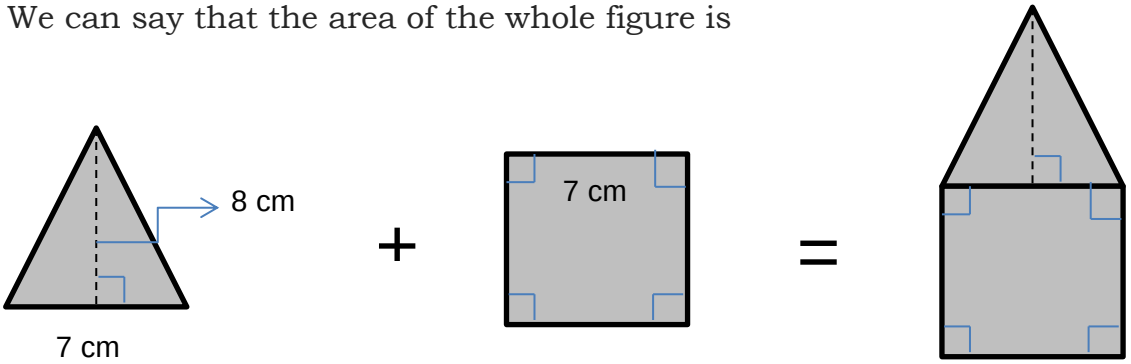
A = s x s

= 7 cm x 7 cm'

A = 49 cm^2



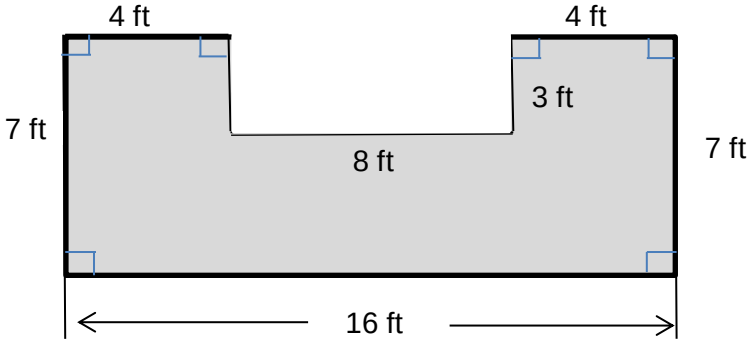
We can say that the area of the whole figure is



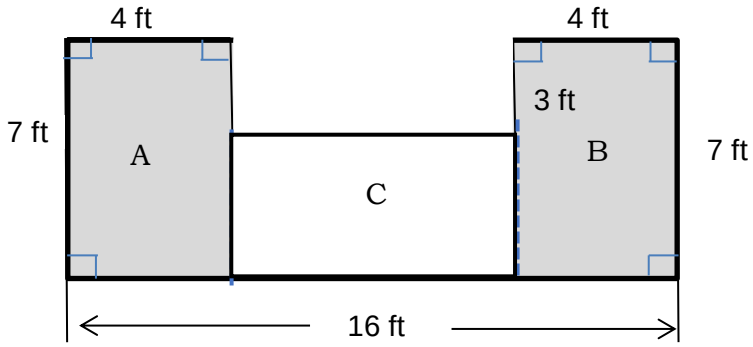
28 cm^2 + **49 cm^2** = **77 cm^2**

Therefore, the area of the composite figure is **77 cm^2**.

Example 2: Find the area of the figure.



We can divide the figure into three rectangles. Two rectangles that measures 7 feet by 4 feet (denoted by A and B below) and the other one that measures 8 feet by 4 feet (denoted with C).



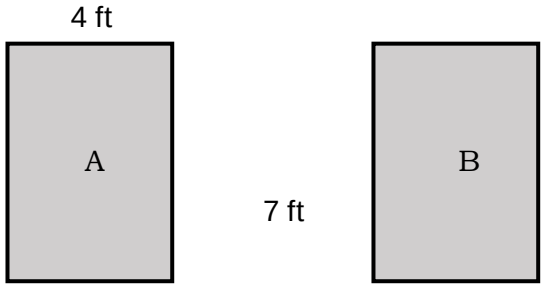
Let us solve the area of each rectangle.

Area of rectangles A and B:

$A_{(A \& B)} = l \times w \times 2$

$= 7 \text{ ft} \times 4 \text{ft} \times 2$

$\mathbf{A_{(A \& B)} = 56 \text{ ft}^2}$

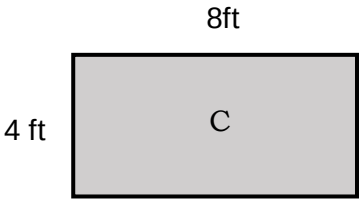


Area of rectangle C:

$A_{(C)} = l \times w$

$= 8 \text{ ft} \times 4 \text{ ft}$

$\mathbf{A_{(C)} = 32 \text{ ft}^2}$

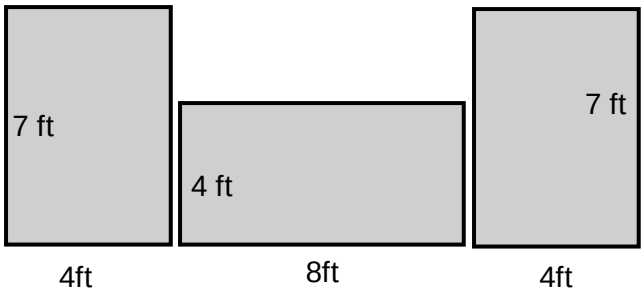


To get the area of the figure, we will add the area of the three rectangles.

$A_{(shaded)} = A_{(C)} + A_{(A \& B)}$

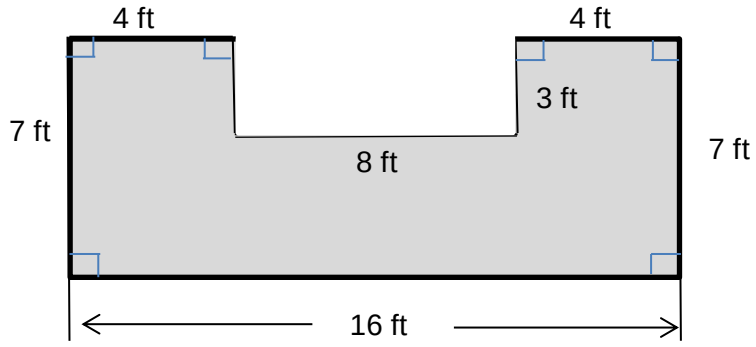
$= 32 \text{ ft}^2 + 56 \text{ ft}^2$

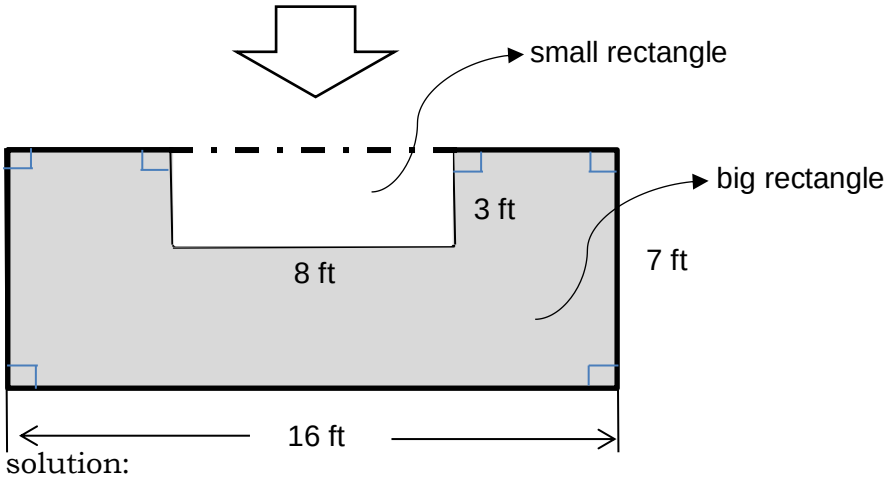
$= \boxed{88 \text{ ft}^2}$



The area of the figure is **88 ft².**

The area of the given figure can be solved by subtracting the area of 3x8 rectangle (small rectangle) from the area of 16 x 7 rectangle (big rectangle).





Consider this solution:

$A_{(\text{big rectangle})} = lw$
$A_{(\text{big rectangle})} = 16 \text{ ft} \times 7 \text{ ft}$
$A_{(\text{big rectangle})} = 112 \text{ ft}^2$

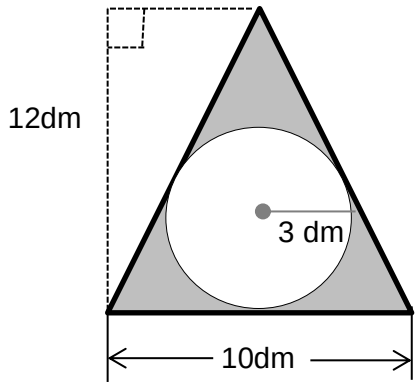
$A_{(\text{small rectangle})} = lw$
$A_{(\text{small rectangle})} = 8 \text{ ft} \times 3 \text{ ft}$
$A_{(\text{small rectangle})} = 24 \text{ ft}^2$

$A_{(\text{big rectangle})} - A_{(\text{small rectangle})} = A_{(\text{shaded figure})}$

$112 \text{ ft}^2 - 24 \text{ ft}^2 = \boxed{88 \text{ ft}^2}$

Example 3:

Find the area of the shaded region. Use $\pi = 3.14$.



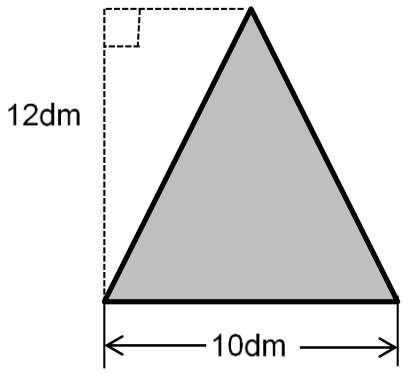
Area of the triangle:

$A = \frac{1}{2} x\ b\ x\ h$

$= \frac{1}{2}\ x\ 10\ dm\ x\ 12\ dm$

$= \frac{1}{2} x\ 120\ dm^2$

A = 60 dm^2



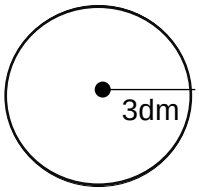
Area of the circle:

A = π x r^2 or π x r x r

= 3.14 x 3 dm x 3 dm

= 3.14 x 9 dm^2

A = 28.27 dm^2

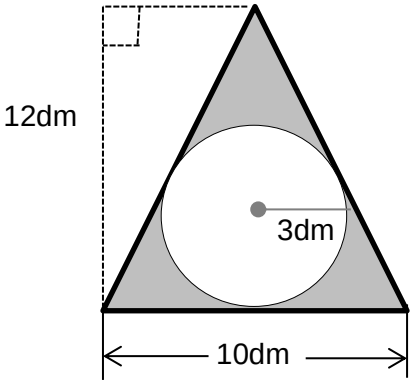


Area of the shaded region:

Area $_{(shaded)}$ = A $_{(triangle)}$ – A $_{(circle)}$

= 60 dm^2 – 28.27 dm^2

Area $_{(shaded)}$ = 31.73 dm^2

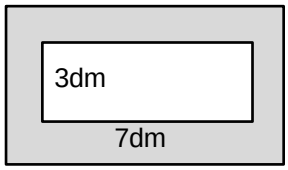


The area of the shaded region is **31.73 dm^2**.

What's More

Find the area of the shaded region on each item. Assume that all angles that appear to be right angles are right angles. Write your answer with complete solution on your answer sheet.

1.



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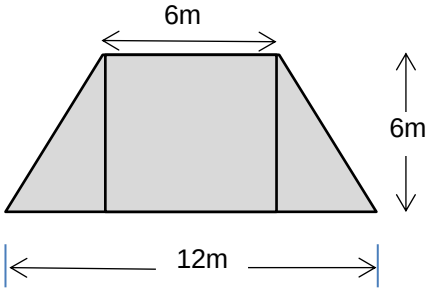

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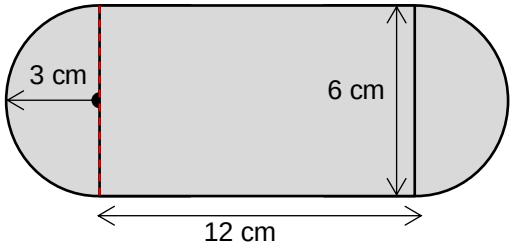

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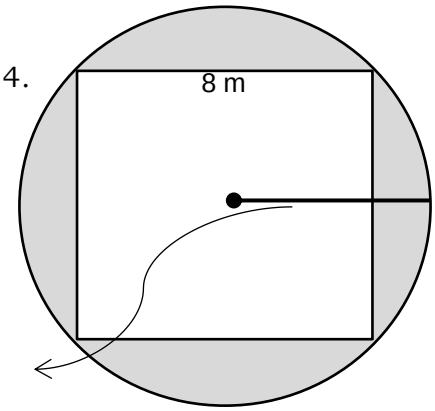

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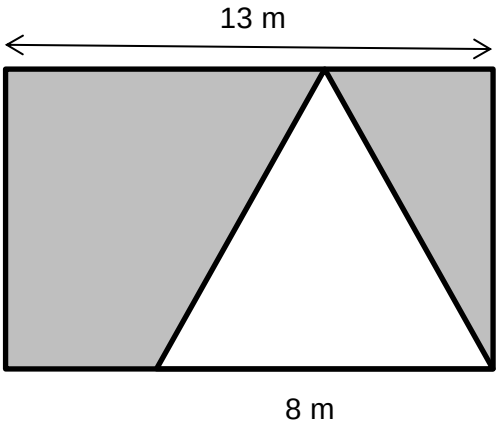


What I Have Learned

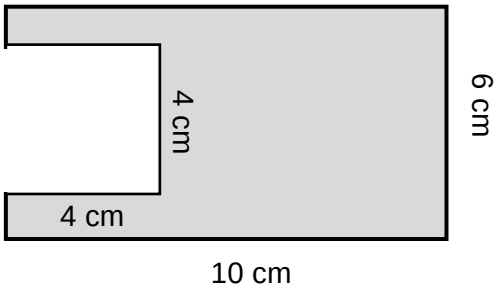
Area is the number of square units needed to cover the surface of plane figures.

Composite figures are figures that can be segmented into two or more basic shapes. Area of composite figures can be solved by finding the area of each shape found in the figure. Add the areas if they are connected and subtract the areas if they overlapped with each other.

What I Can Do

Directions: Find the area of the shaded region on each item. Assume all angles that appear to be right angles are right. Write your answer with complete solution on your answer sheet.

1.



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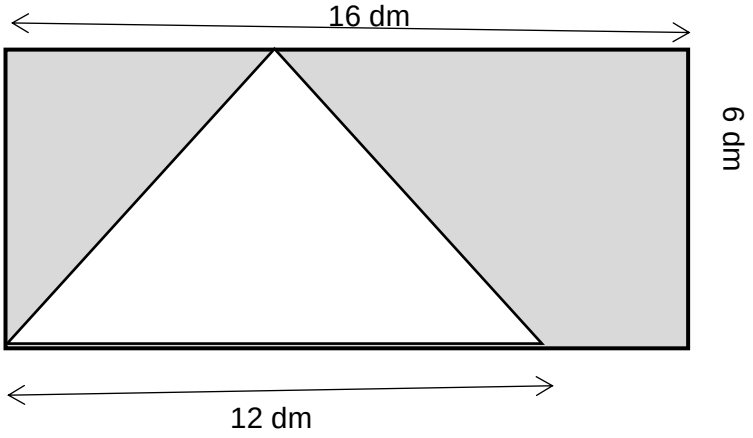

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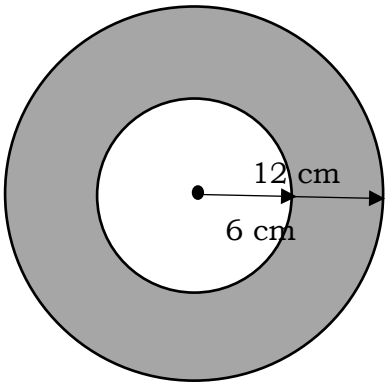

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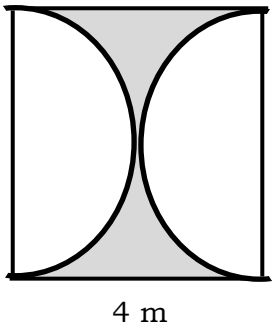
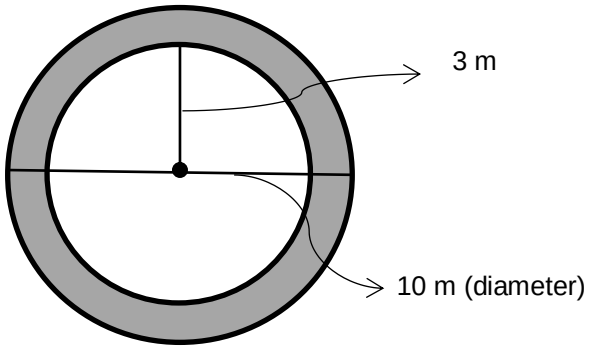


Assessment

Find the area of the shaded part. Write your answer with complete solution on your answer sheet.

1.



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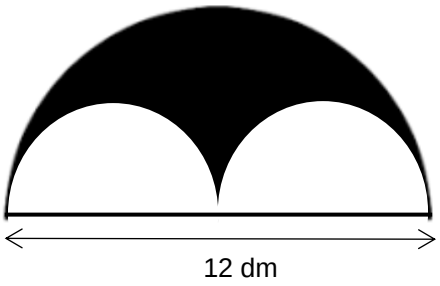

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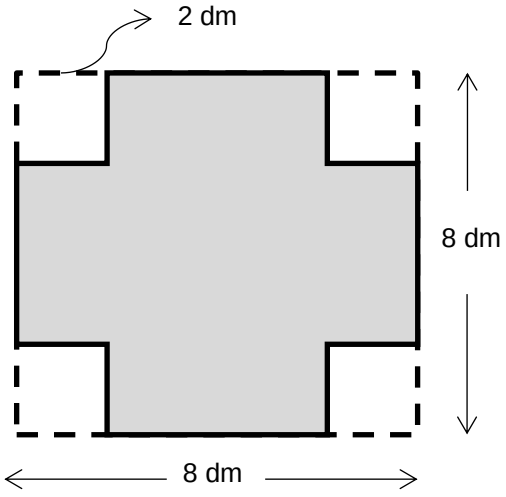

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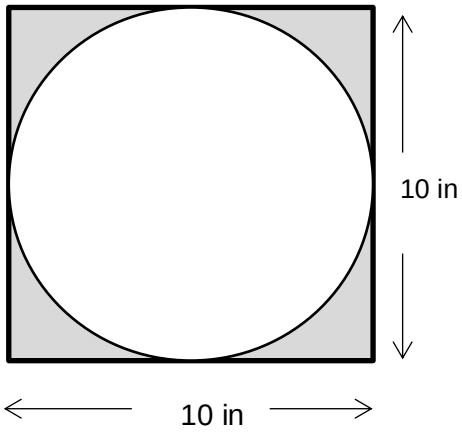

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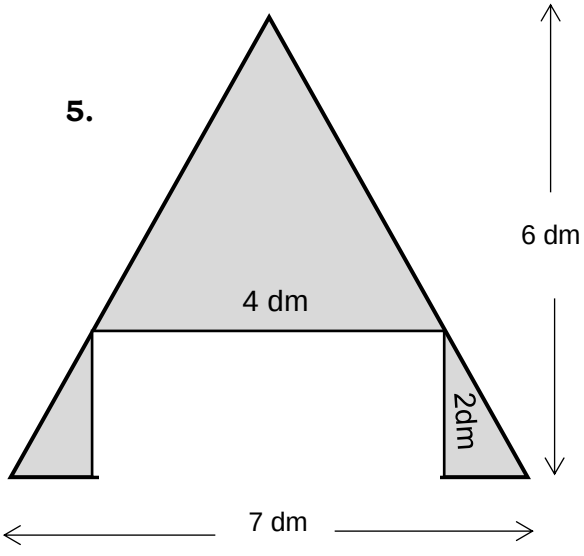
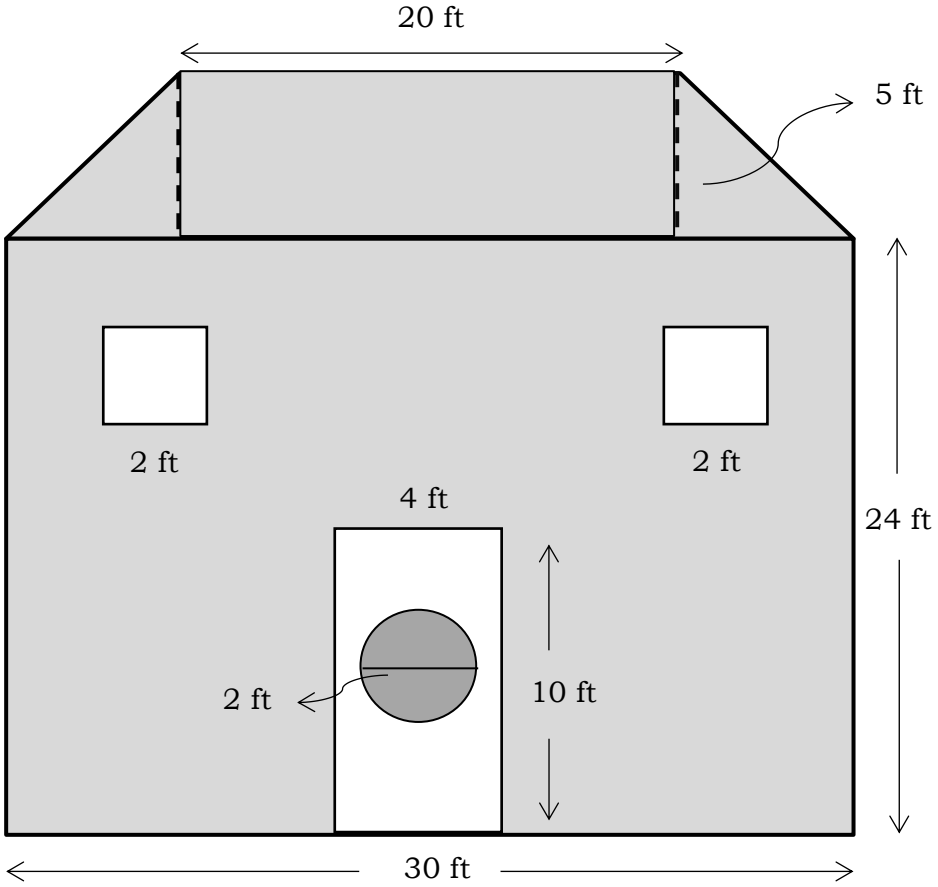


Additional Activities

Look at the drawing below then answer the questions that follow. Write your answers on your paper.



Questions:

_____1. What is the drawing all about?
_____2. How many figures or shapes are there in the drawing?
_____3. What do you call the figure which can be segmented into two or more basic shapes?
_____4. List down the shapes found in the drawing and then write their formula in solving for the area.
   a. _____
   b. _____
   c. _____
   d. _____
_____5. What is the area of the roof?
_____6. What is the area of the unshaded part of the door?
_____7. What is the area of the shaded part of the house?

Answer Key

What I Know

A.

a

d

e

b

B.

1. 36 cm^2
2. 109.86 in^2

What's In

1. 64 cm^2
2. 32 m^2
3. 36 cm^2
4. 53.86 cm^2

What's More

1. 39 dm^2
2. 54 dm^2
3. 100.26 in^2
4. 49.04 m^2
5. 72 m^2

What I Can Do

1. 44 cm^2
2. 60 dm^2
3. 339.12 cm^2
4. 3.44 m^2

Assessment

1. 50.24 m^2
2. 28.26 dm^2
3. 48 dm^2
4. 21.5 in^2
5. 13 dm^2

Additional Activities

1. House
2. 4 shapes
3. Composite figures
4. a. Rectangle $A = l \times w$

   b. Square $A = s \times s$

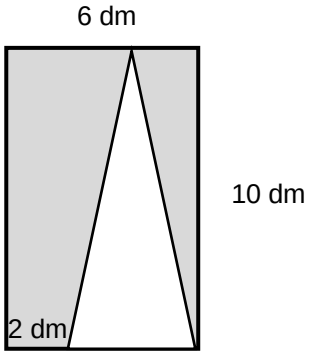
   c. Triangle $A = \frac{1}{2} \times b \times h$

   d. Circle $A = \pi r^2$
5. 125 ft^2
6. 36.86 ft^2
7. 800.14 ft^2

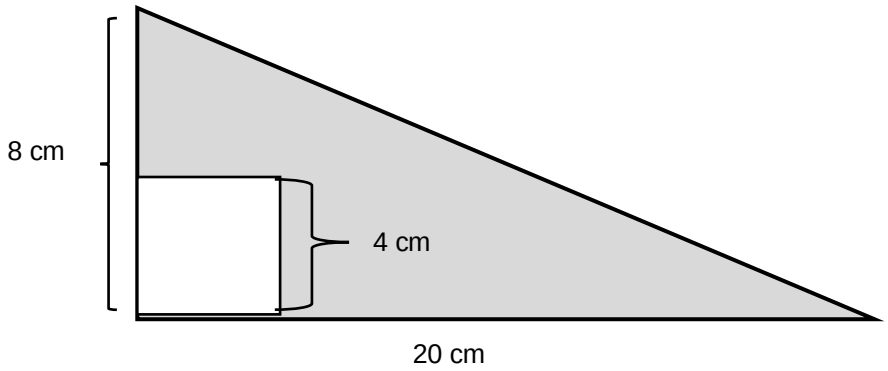
What I Know

Find the area of the following composite figures. Write your answers and complete solutions on your answer sheet.

1.



2.



Read and solve the following problems. Write your answer in your answer sheet.

3. A rectangular playground is 90 m long and 60 m wide. It is surrounded by a 3 m wide raceway. What is the area of the raceway?

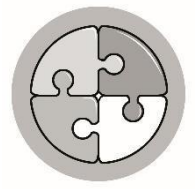
4. The floor of the school stage needs to be refinished. It is in the shape of a trapezoid. The front and back edges are parallel and measure 12 m by 16 m and it measures 5 m from front to back. Find the area of the stage.

5. A 2-meter road surrounds a square spring. The side of the square measures 20 m. What is the area of the road?

Lesson 2

Routine and Non-routine Problems Involving Area of Composite Figures

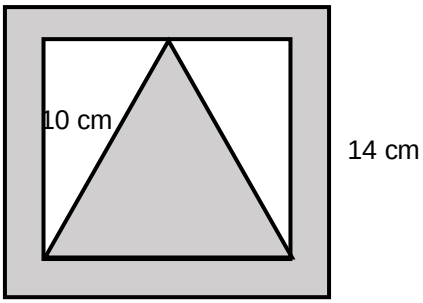
In the previous lessons you have learned how to find the area of composite figures. This time we will apply what we had learned by solving routine and non-routine problems that involve area of composite figures.



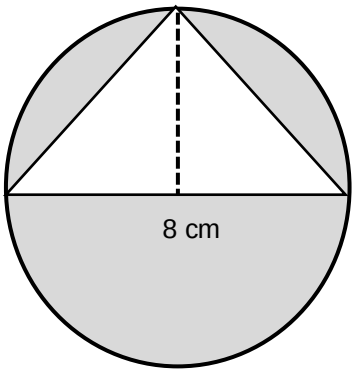
What's In

Solve the following problems. Write your answer and complete solutions on your answer sheet.

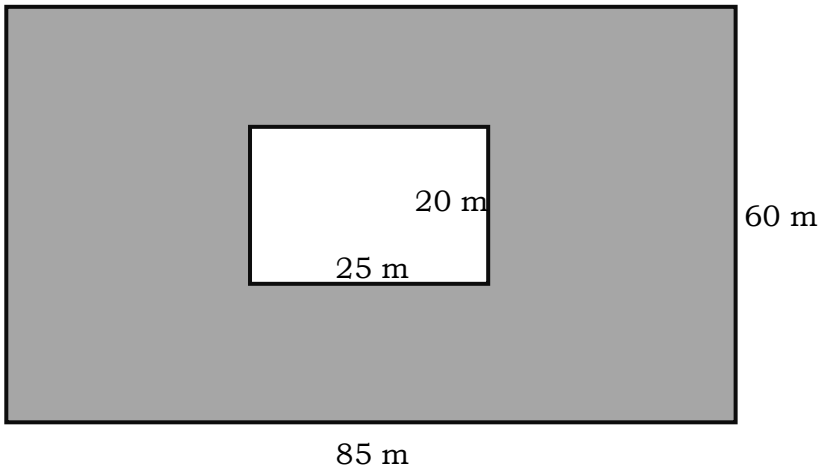
1. Find the area of the shaded region. Assume all figures are squares.



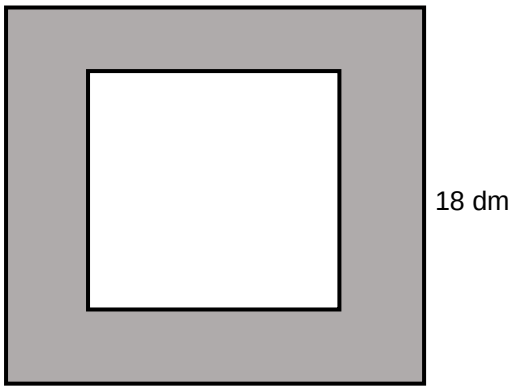
2. Find the area of the shaded region.



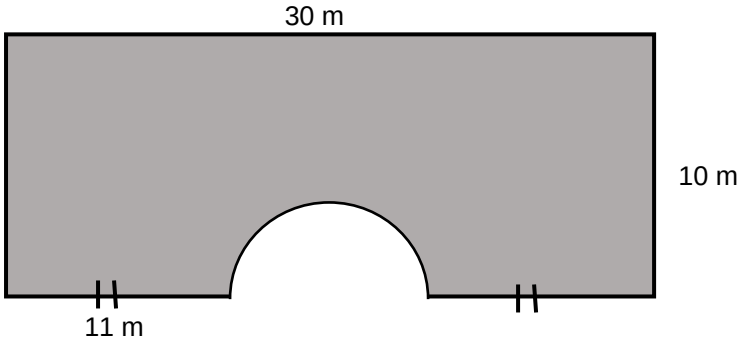
3. A grass lawn is 85 m long and 60 m wide. A rectangular flower plot is found in the middle of the lawn which measures 25 m by 20 m. What is the area covered by the grass?



4. Two squares are positioned as shown. There is a 4 dm margin between the small and large square. What is the area of the shaded part?



5. The diagram below shows the dimensions of Mrs. Lee's swimming pool. A cover is needed for the pool, what is the area of the cover?



What's New

Study this problem:

> Marie bought two leche flan molders. The first molder is a square molder whose side measures 8 inches. The other one is a circular molder with a diameter of 8 inches. How much bigger is the bottom surface of one of the molder than that of the other molder? (Use $\pi = 3.14$)

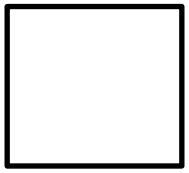
Do you know which molder is bigger?

What is It

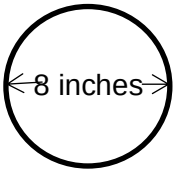
To solve the problem, we will answer the following:

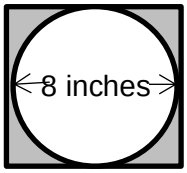
1. Understand:
   a. What is asked?
      Answer: The difference of the area of square molder and circular molder.
   b. What are given?
      Answer: 8 inches side measures of the square molder, 8 inches diameter measures of the circular molder
2. Plan**:** What formula are you going to use?
   *Use the formula in finding the area of circle and square.
3. Solve: Show your computation.

   Solution:
   First, we make an illustration of each. Then compute the areas.



8 inches





8 inches

The area of the square is:

$A = s \times s$

$= 8 \text{ in} \times 8 \text{ in}$

$A = 64 \text{ in}^2$

The diameter of the circle is 8 inches, so the radius is 4 inches. The area of the circle is:

$A = \pi r^2$
$= 3.14 \ (4 \text{ in} \times 4 \text{ in})$
$= 3.14 \times 16 \text{ in}^2$
$A = 50.24 \text{ in}^2$

The square leche flan is larger by about 64 in^2 – 50.24 in^2 = **13.76 in^2.**

4. Check: This is one way to check your answer.

   Go back to your computation. Check if the given dimension is properly substituted to the formula. Check also the flow of your computation.

Problem 2:

A floor is a rectangle, 850 feet by 40 feet, with a semi-circle at each of the short sides. What is the area of the floor ?

1. **Understand:**

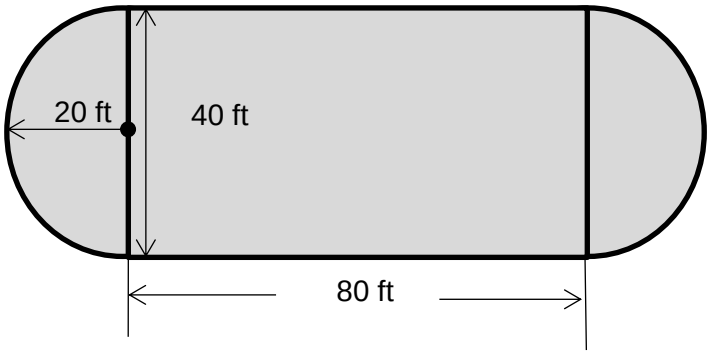
   a. What is asked?
   Answer: The area of the floor.

   b. What are given?
   Answer: rectangle (850 feet by 40 feet), two semi-circle at the short sides

2. **Plan:** What formula are you going to use?
   Use the formula in finding the area of rectangle and circle.

3. **Solve**: Show your computation.
   Solution:

   1. Make an illustration of the problem.



   2. Analyze and identify the figures found in the problem. The figures that we can easily identify are the rectangles and the two semi – circles.

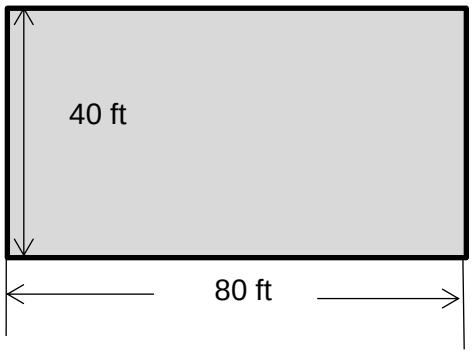
3. Find the area of each figure.

Area of the rectangle

$A = l \times w$

$= 80 \text{ ft} \times 40 \text{ ft}$

$A = 3{,}200 \text{ ft}^2$



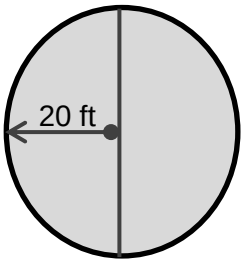
Then let's combine the two semi – circle on both ends of the figures, which will result to a circle. Having this, the combined area of both ends is :

$A = \pi r^2$

$= 3.14 \times 20 \text{ ft} \times 20 \text{ ft}$

$= 3.14 \times 400 \text{ ft}^2$

$A .= 1{,}256 \text{ ft}^2$



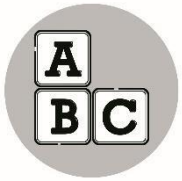
Add the areas of the rectangle and the combined semi-circles.

The area of the rectangle is 3,200 ft^2 plus the area of the combined semi-circles which is 1,256 ft^2. The sum is 4,456 ft^2.

Answer: The total area of the floor is 4,456 ft^2.

4. **Check**: This is one way to check your answer.

Go back to your computation. Check if the given dimension is properly substituted to the formula. Check also the flow of your computation.



What's More

Read and solve the problems following the discussed steps. Write your answer and complete solution on your answer sheet.

1. Two identical right triangular pictures whose base measures 12 dm and the height is 8 dm are placed side by side on a rectangular frame that measures 24 dm by 8 dm. Find the area of the frame that is not covered by the picture?
2. The dimension of a rectangular swimming pool is 35 m by 20 m. A 2-m concrete walk is built around the pool. What is the area of the concrete walk?

What I Have Learned

In solving problem involving area of composite figure, we will follow the following steps:

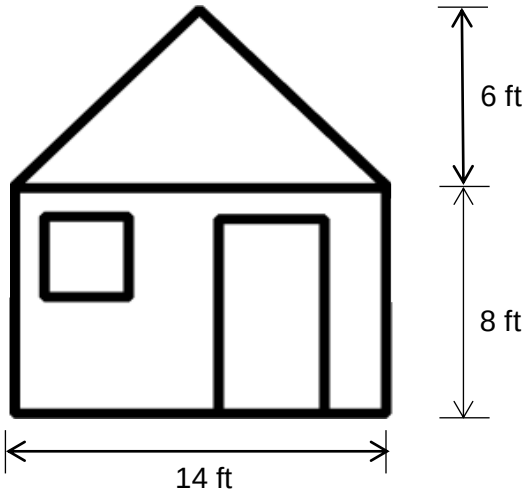
1. Understand:
   a. What is asked?
   b. What are given?
2. Plan: What formula are you going to use?
3. Solve: Show your computation
   a. Make an illustration
   b. Find the area of each figure
   c. Add the areas if the figure is separately drawn from each other.
   d. Subtract the areas if the figures overlapped each other.
4. Check: Check and review your answer.

What I Can Do

Read and solve each problem following the steps. Write your answer and complete solution in your answer sheet.

1. Two circles whose diameter is 6 meters are placed side by side in a rectangular table whose dimension is 12 meters by 6 meters. What is the area of the table not covered by the circle?

2. Jerry was hired to paint the front of a neighbor's shed. Using the illustration on the right for dimensions, how many square feet of paint did he need?



Assessment

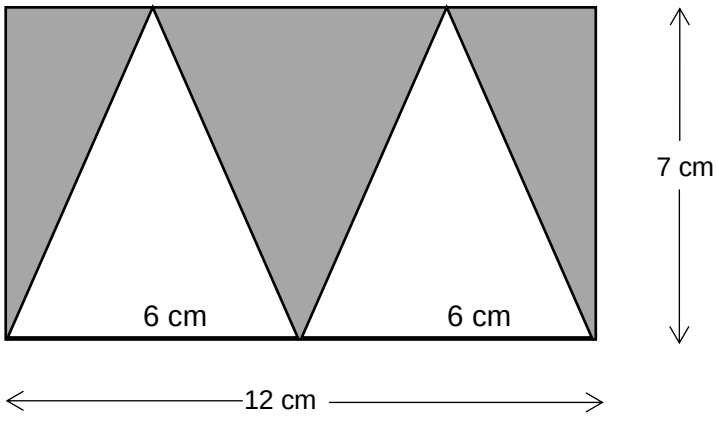
Read and solve the following problems. Write your answer and complete solution in your answer sheet.

1. A rectangle has a length of 7 feet and a width of 4 feet. It is connected with a semi-circle with the same diameter as the width of the rectangle. Find the combined area of the figures.
2. A circular picture whose diameter is 4 decimeters is framed in a rectangular board with dimension of 6 decimeter by 4 decimeters. What is the area of the board that can be seen?
3. A photograph measuring 20 cm by 12 cm is mounted on a rectangular cardboard leaving a margin of 2 cm around. What is the area of the cardboard that is not covered by the photograph?

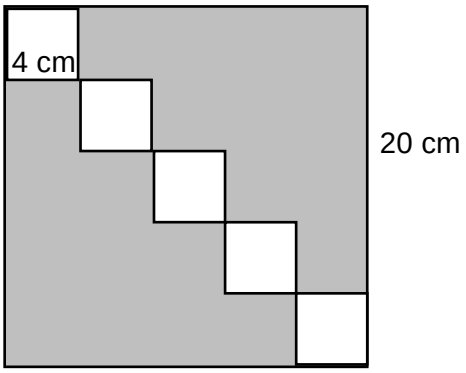
Additional Activities

Read and solve the following: Use $\pi = 3.14$.

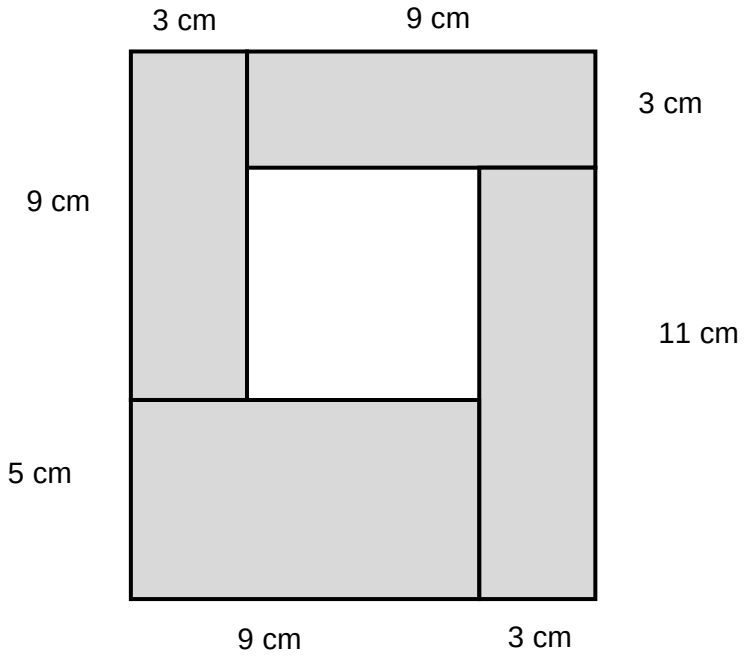
1. Find the area of the shaded part.



2. What is the area of the shaded part?



3. The figure is formed by five rectangles. Find the area of the unshaded region.



Answer Key

What I Know

1. 40 dm^2
2. 64 cm^2
3. 936 m^2
4. 70 m^2
5. 144 m^2

What's In

1. 146 cm^2
2. 34.24 cm^2
3. 4600 m^2
4. 224 dm^2
5. 249.76 m^2

What's More

1. 96 dm^2
2. 236 m^2

What I Can Do

1. 15.48 m^2
2. 154 ft^2

Assessment

1. 34.28 ft^2
2. 11.44 dm^2
3. 114 dm^2

Additional Activities

1. 42 cm^2
2. 320 cm^2
3. 36 cm^2

References:

Lumbre, A. et al. (2016). *21st Century MATHletes Textbook for Grade 5*: Vibal Group Inc.

Perez, M. et al. (2016). *21st Century MATHletes 6. Philippines*: Vibal Group Inc.

Tan, A. et al. (2007). *Hypermath 6. Philippines*: Trinitas Publishing, Inc.

Most Essential Learning Competencies (MELC) in Mathematics 6

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