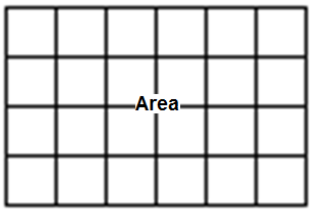
Lesson 7.G.6 (ALT 3) – Area of Complex Figures (with Rectangles and Triangles)

Student Notes

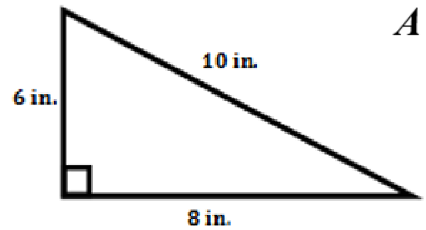
SETION 1: Area of Rectangles and a Triangle

To find the area of a rectangle use $A = bh$ or $A = lw$.

To find the area of a triangle we can use the formula: $A = \frac{1}{2} bh$

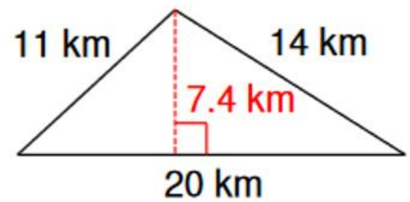


$A = lw$
$= 6 \bullet 4$
$= 24\ u^2$



$A = \frac{1}{2} bh$
$= (\frac{1}{2})(8)(6)$
$= 24\ in^2$

You Try!

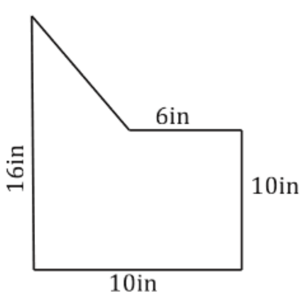


$A = \frac{1}{2} bh$
$= (\frac{1}{2})(20)(7.4)$
$= 74\ km^2$

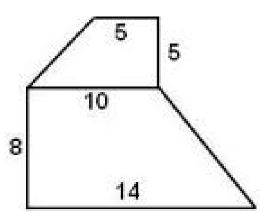
SETION 2: What are Complex Figures?

A <u>Complex figure</u> is a figure that can be divided into more than one of the basic shapes. Some people call these figures irregular figures. Some complex figures are shapes that connect to make a bigger shape. Other complex figures are shapes inside of other shapes.

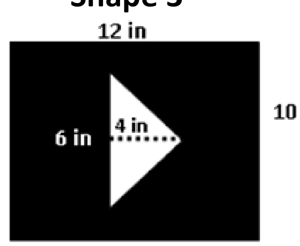
Shape 1



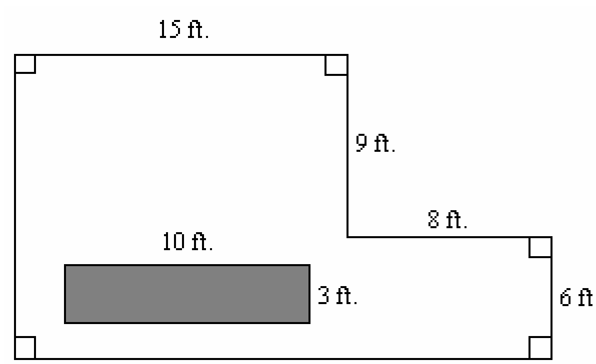
Shape 2



Shape 3



Shape 4



Answers will vary, but students may see rectangles, triangles, and trapezoids.

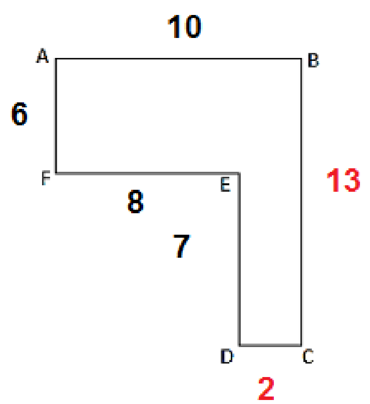
SETION 3: Decomposing Complex Figures

In order to find the area of a complex figure, you need to know how to find missing side lengths. You also need to be able to decompose the figure into individual shapes.

Guided Practice

If AB = 10, FE = 8, AF = 6 and DE = 7, find the lengths of the other sides.

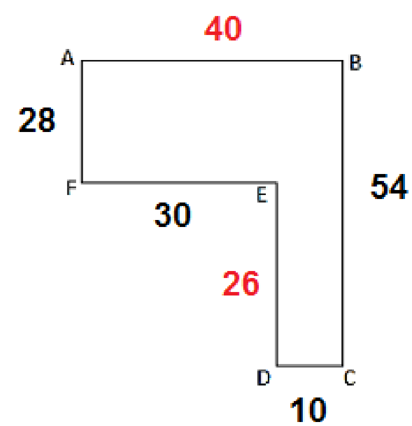
DC = BC =



You Try!

If DC = 10, FE = 30, AF = 28 and BC = 54, find the lengths of the other sides.

AB = DE =

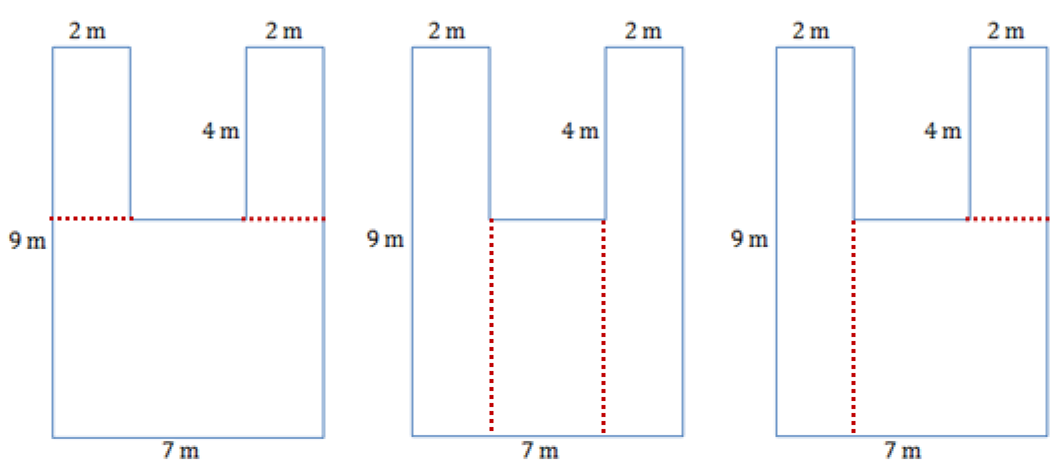


You Try!

Sometimes there is more than one way to decompose a complex figure!

The Intermediate School is producing a play that needs a special stage built. A diagram is shown below.

- On the first diagram, divide the stage into three rectangles using two horizontal lines.
- On the second diagram, divide the stage into three rectangles using two vertical lines.
- On the third diagram, divide the stage into three rectangles using one horizontal line and one vertical line.



SETION 4: Finding the Area of Complex Figures

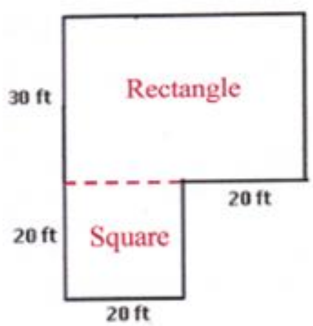
There is not an easy formula to find the area of complex figures. Now is the time when you really need to understand how to compose and decompose a figure.

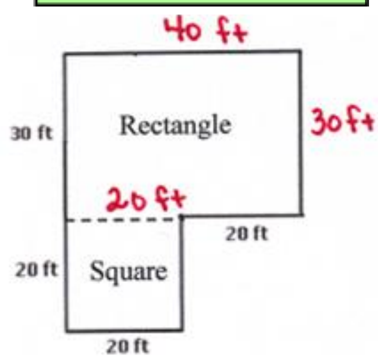
- There are two types of complex figures: Shapes that connect
  Shapes inside of shapes
- How you calculate the area depends upon what type of complex figure you have and the shapes that can be decomposed.

Shapes that Connect

Find the *total area* of the shape below.

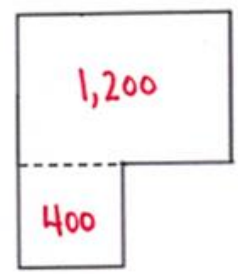
Step 1: Decompose the complex figure into basic shapes. → **Step 2:** Find missing side lengths if necessary. → **Step 3:** Find the area of each individual shape. → **Step 4:** *Add* the areas together to get the total area.





Rectangle:
A = L × W
A = 40 × 30
A = 1,200 ft²

Square:
A = L × W
A = 20 × 20
A = 400 ft²

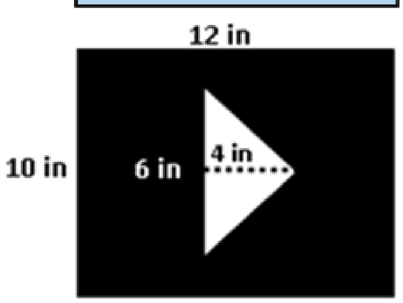


Total Area:
1,200 + 400 = 1600 ft²

Shapes Inside of Shapes

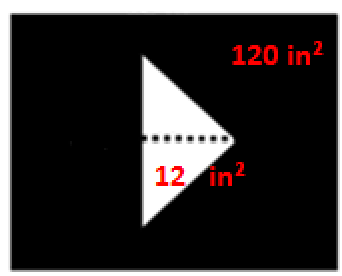
Find the area of the *shaded region* of the shape below.

Step 1: Decompose the complex figure into basic shapes. → **Step 2:** Find missing side lengths if necessary. → **Step 3:** Find the area of each individual shape. → **Step 4:** *Subtract* the smaller area from the bigger area.



Rectangle
A = b • h
A = 12 • 10
A = 120 in²

Triangle
A = ½ • b • h
A = ½ • 6 • 4
A = 12 in ²



Shaded Region: 120 – 12 =

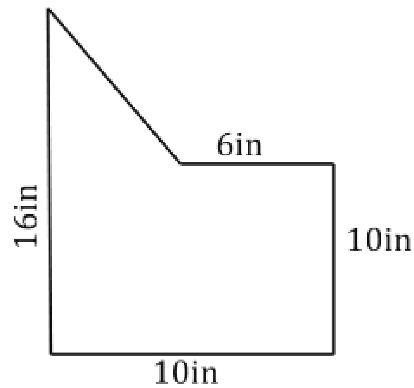
120 – 12 = 108 in²

Classwork

Name_______________________________ Date___________ Period: _____ **Answer Key**

Shapes that Connect

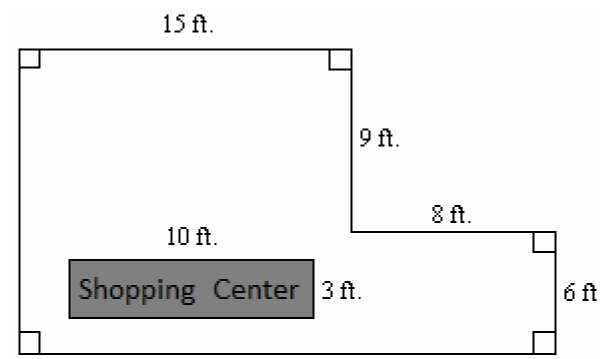
1) Find the total area. **Answer: 112 in²**



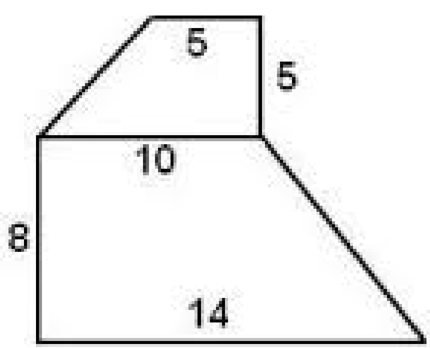
Shapes Inside of Shapes

2) Below is an outdoor shopping center. The shopping center is surrounded by a parking lot. Find the area of the parking lot.

Answer: 243 ft²

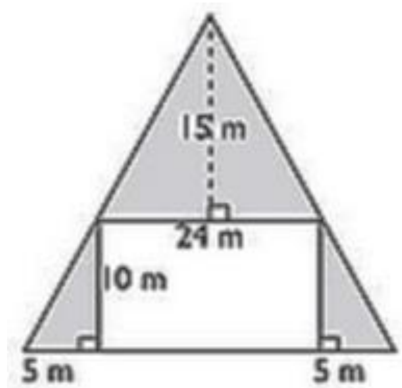


3) Find the total area. **Answer: 133.5 units²**

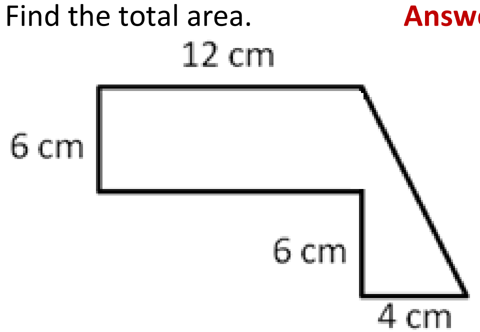


4) Find the area of the shaded region.

Answer: 185 m²

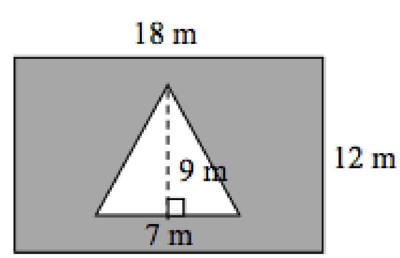


5) Find the total area. **Answer: 96 cm²**



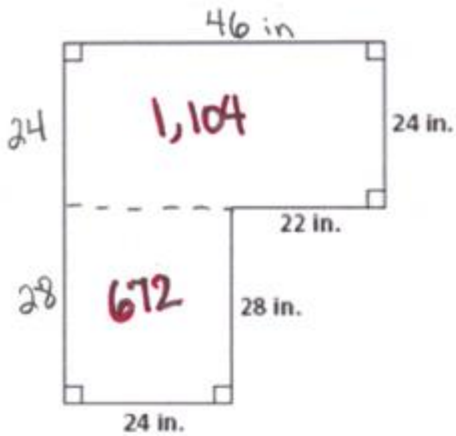
6) Find the area of the shaded region.

Answer: 184.5 m²



Extra Practice
Name______________________________________ Date__________ Period: ____ **Answer Key**

1) The top-view of Mr. thopson's office desk is shown below.
What is the area of the top of Mr. thompson's office desk?

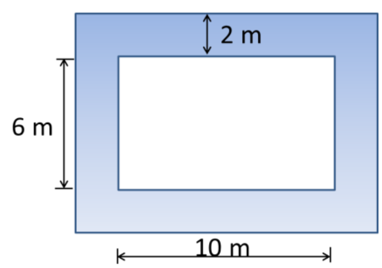


rectangle 1
A = L x W
46 x 24 = 1,104 in²

rectangle 2
A = L x W
28 x 24 = 672 in²

Total Area
1104 + 672 = 1,776 in²

2) A rectangular flower bed measures 10 m by 6 m. It has a path 2 m wide around it. Find the area of the path.

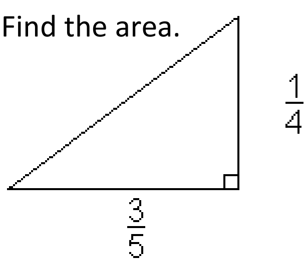


Outside rectangle: A = b x h
14 x 10 = 140 m^2

Inside rectangle: A = b x h
10 x 6 = 60 m^2

Shaded Path: 140 – 60 = 80 m^2

3) Find the area.

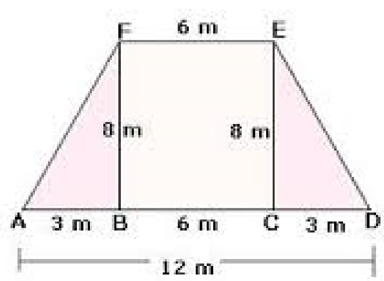


$A = \frac{1}{2} \bullet b \bullet h$

$A = \frac{1}{2} \bullet \frac{3}{5} \bullet \frac{1}{4}$

$\mathbf{A = \frac{3}{40}\ u^2}$

4) Find the area.



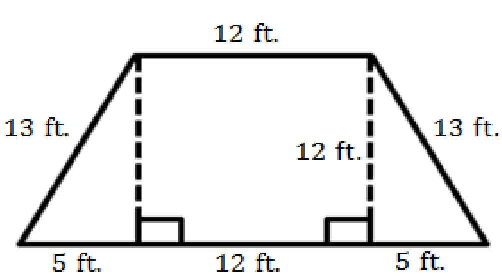
Triangle $\frac{1}{2} \bullet 3 \bullet 8 = 12$

Triangle $\frac{1}{2} \bullet 3 \bullet 8 = 12$

Rectangle $6 \bullet 8 = 48$

A = 72 m²

5) Find the area.



Triangle $\frac{1}{2} \bullet 5 \bullet 12 = 30$

Triangle $\frac{1}{2} \bullet 5 \bullet 12 = 30$

Rectangle $12 \bullet 12 = 144$

A = 204 ft²