



## Composite Figures

Suggested time: 75 minutes

### **What's important in this lesson:**

In this lesson you will calculate the perimeter and area of composite figures. You will be required to use their algebraic skills and the Pythagorean Theorem.

### **Complete these steps:**

1. Read through the lesson portion of the package independently.
2. Complete any of the examples in the lesson
3. Check your lesson answers with the lesson key your teacher has.
4. Seek assistance from the teacher as needed.
5. Complete the Assessment and Evaluation and submit for evaluation. Be sure to ask for any assistance when experiencing difficulties.

### **Hand-in the following to your teacher:**

1. Assessment and Evaluation

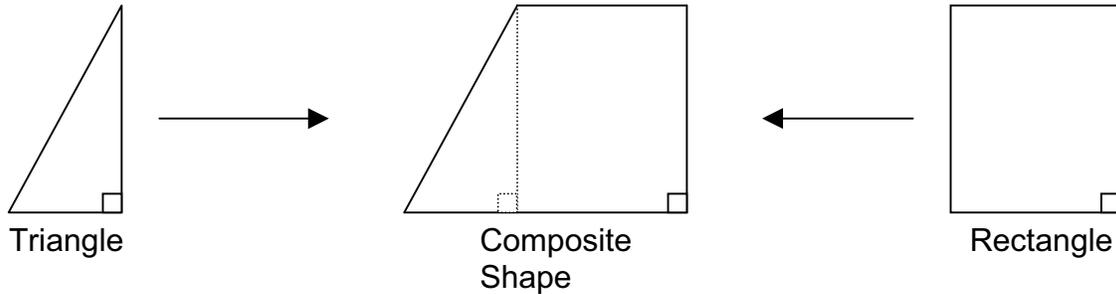
### **Questions for the teacher:**





## Perimeter and Area of Composite Figures

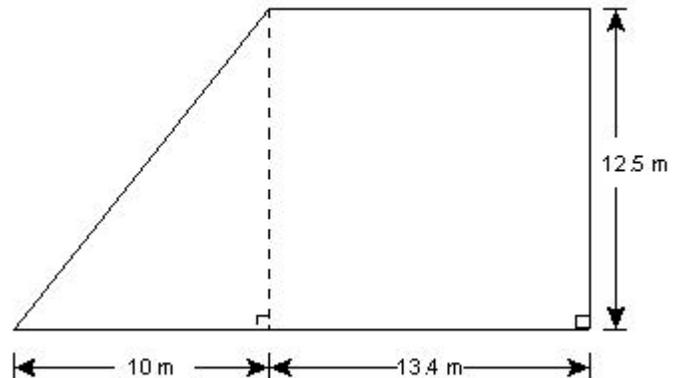
Composite figures are figures that are made up of more than one shape. For example, the shape may consist of a triangle and a rectangle joined together to form a single shape. The resulting shape is a composite figure because it is composed of the other two shapes.



To calculate the area of a composite figure it is usually easiest to treat the figure as two separate shapes.

### Example #1

Calculate the perimeter and area of the shape. Round answers to one decimal place.



### Solution - Area

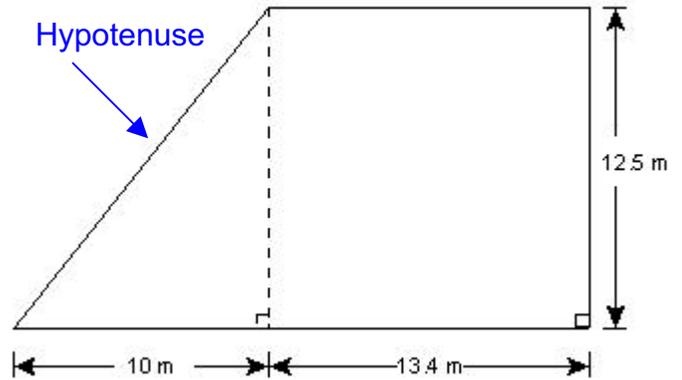
To calculate the area you must break the figure into two parts – a triangle and a rectangle

<p><u>Triangle</u></p> $A = \frac{bh}{2}$ $= \frac{10 \times 12.5}{2}$ $= 62.5$	<p><u>Rectangle</u></p> $A = l \times w$ $= 13.4 \times 12.5$ $= 167.5$
<p>Total Area = Area of Triangle + Area of Rectangle</p> $= 62.5 + 167.5$ $= 230$	
<p>Therefore the area of the figure is 230 m<sup>2</sup></p>	



**Solution – Perimeter**

To calculate the perimeter we must concern ourselves with the hypotenuse of the triangular portion. The hypotenuse is part of the outside distance around the figure. In order to calculate the length of the hypotenuse we need to make use of the Pythagorean theorem.



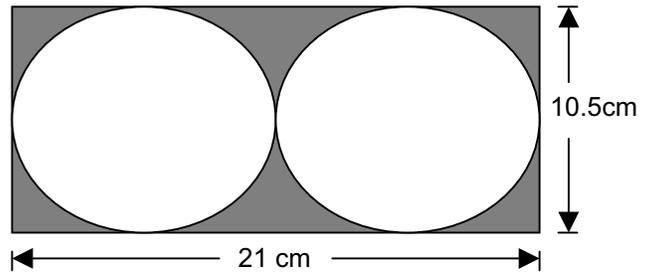
$$\begin{aligned}
 h^2 &= 12.5^2 + 10^2 \\
 h^2 &= 156.25 + 100 \\
 h^2 &= 256.25 \\
 h &= \sqrt{256.25} \\
 h &= 16.0
 \end{aligned}$$

$$\begin{aligned}
 \text{Perimeter} &= 10 + 13.4 + 12.5 + 13.4 + 16 \\
 &= 65.3
 \end{aligned}$$

Therefore the perimeter is 65.3 m.

**Example #2**

Calculate the area of the shaded region. Round the answer to the nearest tenth of a cm.



**Solution**

We need to think of the figure as a rectangle with two circles cut out.

$$\text{Shaded Area} = \text{Area of Rectangle} - 2 \times \text{Area of Circle}$$

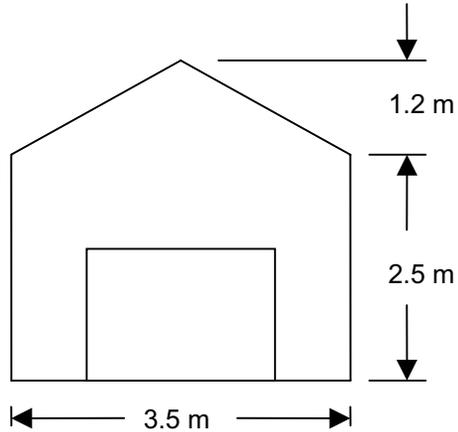
<p><u>Rectangle</u></p> $  \begin{aligned}  A &= l \times w \\  &= 21 \times 10.5 \\  &= 220.5  \end{aligned}  $	<p><u>Area of Circle</u></p> $  \begin{aligned}  A &= \pi r^2 \\  &= \pi (5.25)^2 \\  &= 86.6  \end{aligned}  $ <p><b>Note:</b> Diameter of circle is equivalent to the width of rectangle. Therefore, the radius is 5.25 or <math>\frac{10.5}{2}</math></p>
$  \begin{aligned}  \text{Shaded Area} &= \text{Rectangle} - 2 \times \text{Circles} \\  &= 220.5 - 2 \times 86.6 \\  &= 47.3  \end{aligned}  $ <p>Therefore the area of the shaded region is 47.3 m<sup>2</sup></p>	



**Example #3**

The front of your garage needs painting. The total area needs to be painted except for the door. The door is 1.5m high and 2 m wide.

- (a) How many square metres of paint are required?
- (b) A can of paint covers  $2.5 \text{ m}^2$ . How many cans will you require to complete the job?
- (c) If one can of paint costs \$ 19.89, then how much money will it cost you to paint the side of your garage?
- (d) In Ontario the tax rate of paint is 15%. How much will your paint purchase cost you, including taxes?



**Solution**

(a)

<u>Area of Rectangle</u>	<u>Area of Triangle</u>	<u>Area of Door</u>
$A = l \times w$ $= 3.5 \times 2.5$ $= 8.75$	$A = \frac{b \times h}{2}$ $= \frac{3.5 \times 1.2}{2}$ $= 2.1$	$A = l \times w$ $= 2 \times 1.5$ $= 3$
<p>Area to be painted = Area of Rectangle + Area of Triangle – Area of Door</p> $= 8.75 + 2.1 - 3$ $= 7.85$		
<p>Therefore, the total area to be painted is <math>7.85 \text{ m}^2</math></p>		

(b) A can of paint covers  $2.5 \text{ m}^2$  and we have  $7.85 \text{ m}^2$  to paint.

$$\text{Number of Cans} = \frac{7.85}{2.5}$$

$$= 3.14$$

Therefore, you will need to purchase 4 cans of paint to ensure you have enough for the garage.



(c) Cost of Paint =  $19.89 \times 4$   
 $= 79.56$

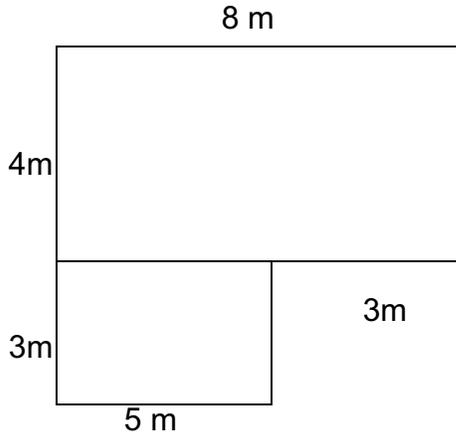
Therefore, the cost of the paint is \$ 79.56

(d) Cost including taxes =  $79.56 \times 1.15$   
 $= 91.49$

Therefore, the cost of the paint including taxes is \$ 91.49

**Exercise.**

1. (a) Determine the perimeter of the yard. Show your work.



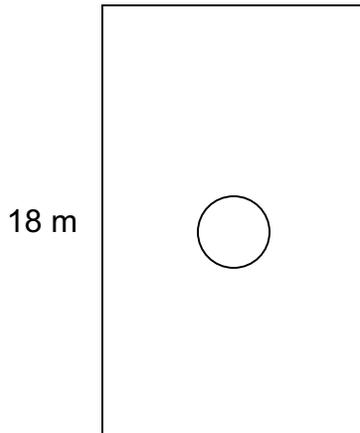
- (b) If fencing costs \$24.59/m, how much would it cost to enclose this yard?

- (c) Determine the area of the yard.

- (d) If the cost of seeding 1 m<sup>2</sup> is \$1.15, how much will it cost to seed the yard?



2. (a) Determine the perimeter and area of the driveway. Show your work.  
12 m

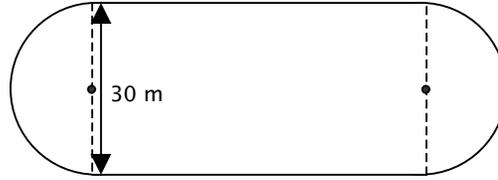


- (b) In the centre of this driveway is a circular garden with a radius of 1m. Determine the area of the garden.
- (c) The cost of shoveling the driveway depends on the area. Calculate the area of the driveway that would need shoveling.
- (d) If it costs \$0.35 to shovel  $1 \text{ m}^2$ , how much would it cost to shovel this driveway?



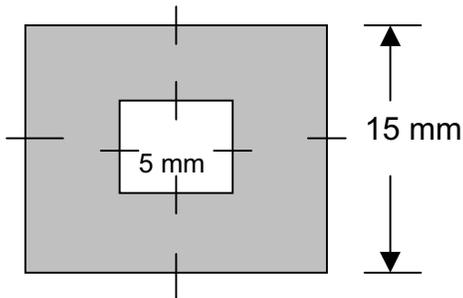
Round all answers to one decimal place

1. Consider the track below.



- a) Find the perimeter of the field.                      b) Find the area of the field.

2. Find the area of the shaded region.





3. Bill wishes to replace the carpet in his living room and hallway with laminate flooring. A floor plan is shown.

(a) Find the total area of floor to be recovered.

(b) Laminate flooring comes in boxes that contain  $2.15\text{m}^2$  of material. How many boxes will Bill require?

(c) One box costs \$ 43.25. How much will the flooring cost? (include PST and GST)

(d) When laying laminate flooring, it is estimated there will be 5% waste. How much waste can Bill expect on his project?

