Unit Outline ● Surface Area   Name: _____
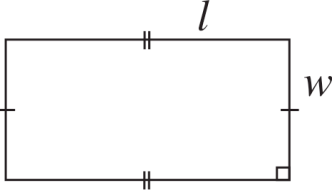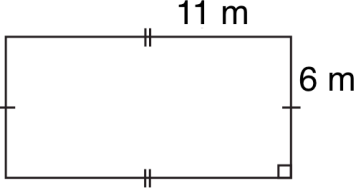
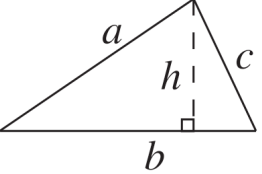| Date			Topic	Assignment
M O N	M O N T H	1	Perimeter and Area of 2D Objects	p. 1-2
T U E		2	Area of Composite and Cutout 2D Objects	p. 3-4
W E D		3	Surface Area of 3D Objects	p. 5-6
T H U		4	Surface Area of Composite 3D Objects	p. 7-8
F R I		5	Surface Area of 3D Objects with Cut-outs	p. 9-10
M O N		6	Applications of Surface Area	p. 11-12
T U E		7	Review	Review WS
W E D		8	Unit Test: Surface Area	
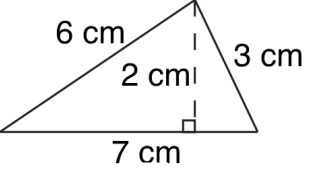
1 ● **Perimeter and Area of 2D Objects**   **Name:** _____
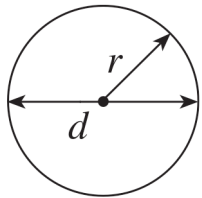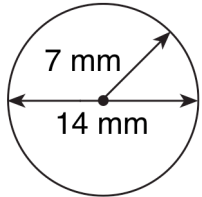
1. Perimeter and Area of a Rectangle

	Perimeter	Area
	$Perimeter = 2(length) + 2(width)$	$Area = (length)(width)$

Example: Find the perimeter and area of the rectangle.

	P =	A =

2. Perimeter and Area of a Triangle

	Perimeter	Area
	$Perimeter = side\,a + side\,b + side\,c$	$Area = \dfrac{(base)(height)}{2}$

Example: Find the perimeter and area of the triangle.

	P =	A =

3. Circumference and Area of a Circle

	Circumference	Area
	$Circumference = (Pi)(diameter)$ Note: $d = 2r$	$Area = (Pi)(radius)^2$ Note: BEDMAS

Example: Find the circumference and area of the circle. Leave your answer in terms of Pi.

7 mm 14 mm		
	C =	A =

Practice Questions

1. Find the area of the parallelogram.

7 km

5 km   4 km

A =

2. Find the area of the semi-circle. Leave the final answer in terms of Pi.

r = 6 cm

A =

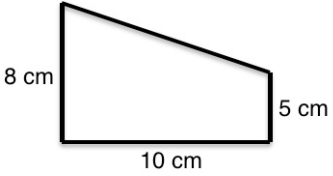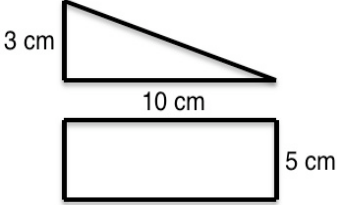| 2 ● **Area of Composite and Cut-out 2D Objects**	**Name:** _____

Composite figures are made up of two or more simple shapes. They can be broken down into basic components (ie. rectangles, triangles, and circles) in order to solve for the overall area.
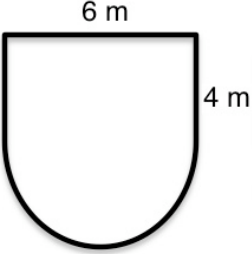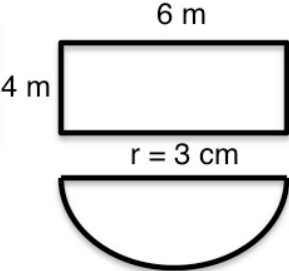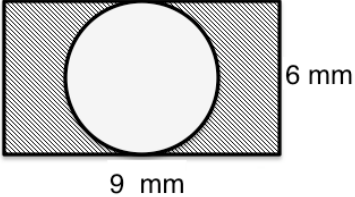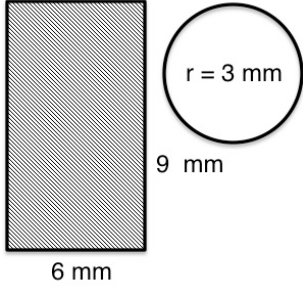
Use the following steps to find the area of composite shapes:

1. Draw lines to form simple shapes.
2. Redraw the basic shapes and label the measurements.
3. Calculate the area of the simple shapes.
4. Add all of the areas together.

1. Rectangle and Triangle

1. Draw lines to form simple shapes.	2. Redraw the basic shapes and labels the measurements.	3. Calculate the area of the simple shapes.
8 cm 10 cm 5 cm	3 cm 10 cm 5 cm	
4. Add all of the areas together.		$A_{total}=$

2. Rectangle and Semi-circle

1. Draw lines to form simple shapes.	2. Redraw the basic shapes and labels the measurements.	3. Calculate the area of the simple shapes. (Leave in terms of Pi).
6 m 4 m	6 m 4 m r = 3 cm	
4. Add all of the areas together. (Round to 1 decimal place).		$A_{total}=$

Cut-out figures have simple shapes removed from them. They can be broken down into basic components (ie. rectangles, triangles, and circles) in order to solve for the overall area.
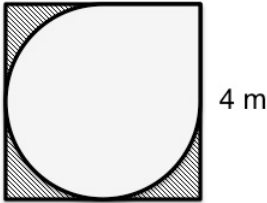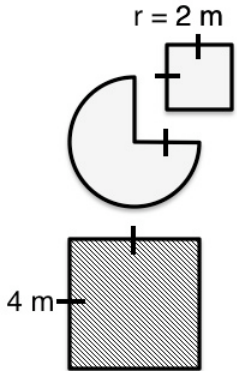
Use the following steps to find the area of composite shapes:

1. Draw lines to form simple shapes.
2. Redraw the basic shapes and labels the measurements.
3. Calculate the area of the simple shapes.
4. Add all of the areas together and subtract any areas that are missing.

1. Rectangle with Circle Cut-out

1. Draw lines to form simple shapes.	2. Redraw the basic shapes and labels the measurements.	3. Calculate the area of the simple shapes. (Leave in terms of Pi).
9 mm 6 mm	r = 3 mm 9 mm 6 mm	

4. Add all of the areas together and subtract any areas that are missing.	$A_{total}=$

2. Square with Composite Cut-out

1. Draw lines to form simple shapes.	2. Redraw the basic shapes and labels the measurements.	3. Calculate the area of the simple shapes. (Leave in terms of Pi).
4 m 4 m	r = 2 m 4 m	

4. Add all of the areas together. (Round to 1 decimal place).	$A_{total}=$

Part I: Determine the perimeter and area of the figures below. Show all calculations, round the final answer to one decimal place, and include units for full marks.
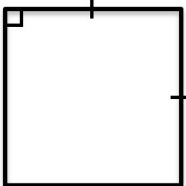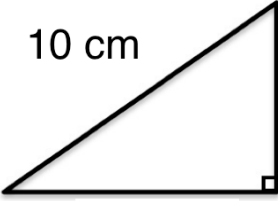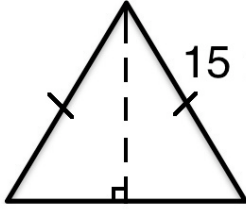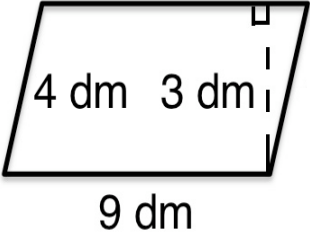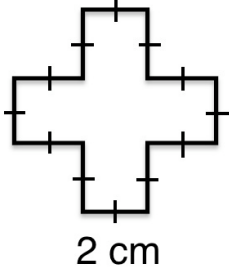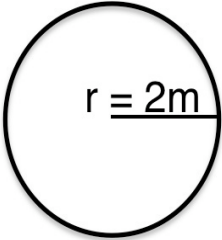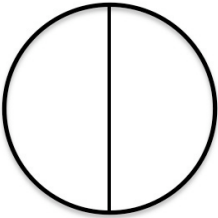
Figure	Perimeter	Area
1. 7 m		
2. 13 km 5 km		
3. 10 cm 6 cm 8 cm		
4. h = 12 mm 15 mm 18 mm		

Figure	Perimeter	Area
5. 4 dm 3 dm 9 dm		
6. 2 cm		

Part II: Determine the circumference and area of the figures below. Show all calculations, round the final answer to 1 decimal place, and include the correct units.
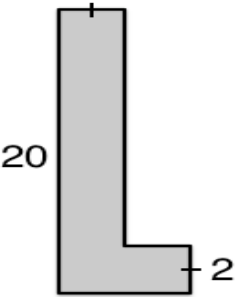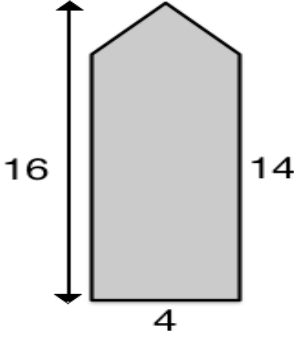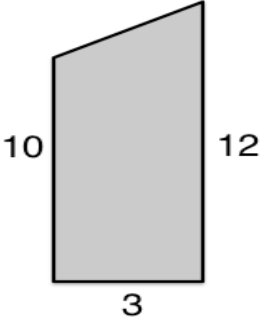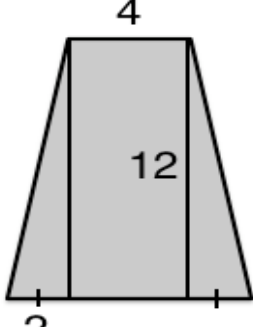
Figure	Circumference	Area
7. r = 2m		
8. d = 17 cm		

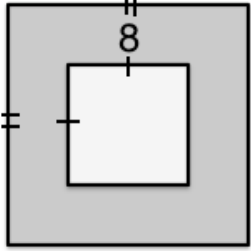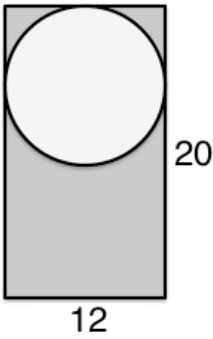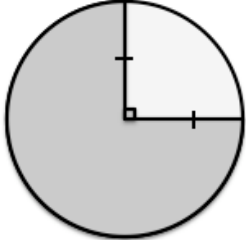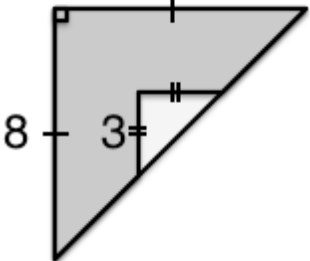|			
1. 28 m, 49 m²	2. 36 km, 65 km²	3. 24 m, 24 cm²	4. 48 mm, 109 mm²
5. 26 dm, 36 dm²	6. 24 cm, 20 cm²	7. 12.6 m, 12.6 m²	8. 53.4 cm, 227.0 cm²

Part I: Find the area of each 2D composite shape. Assume all values are in metres. Show all calculations, round the final answer to 1 decimal place, and include units for full marks.

Figure	Calculate the area of each basic shape involved	Total the areas
1. 20 2		
2. 16 14 4		
3. 10 12 3		
4. 4 12 2		

Part II: Find the shaded area of the cut-out 2D shapes. Assume all values are in metres. Show all calculations, round the final answer to 1 decimal place, and include units for full marks.
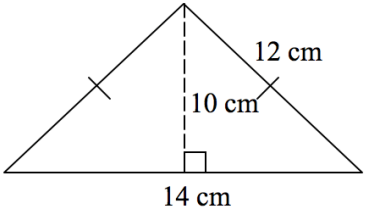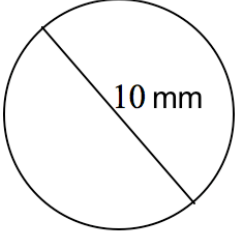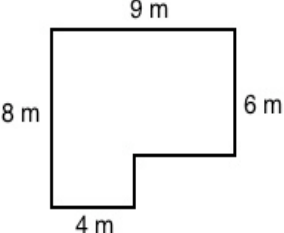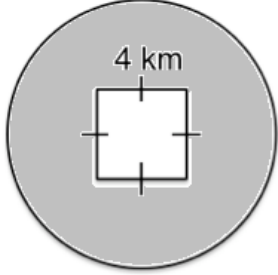
Figure	Calculate the area of each basic shape involved	Total the areas
5. 16 / 8		
6. 20 / 12		
7. r = 3		
8. 8 / 3		

1. 144 m²	2. 58 m²	3. 32 m²	4. 72 m²
5. 192 m²	6. 126.9 m²	7. 21.2 m²	8. 27.5 m²

Complete the following table. Show all calculations, round the final answer to one decimal place, and include units for full marks.

| Figure	Perimeter or Circumference	Area
1. 12 cm 10 cm 14 cm		
2. 10 mm		
3. 9 m 8 m 6 m 4 m		
4. 4 km d = 12 km		

Name: _____

Read the question carefully and restate any important information. Carry all numbers to the last step and write the final answer rounded to one decimal place with units in the provided box.
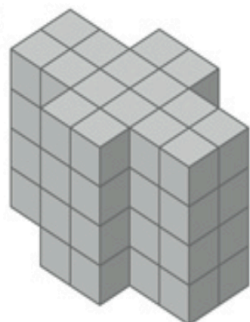
1. Find the area of the shaded area of a circle that has had a quarter circle removed from it.
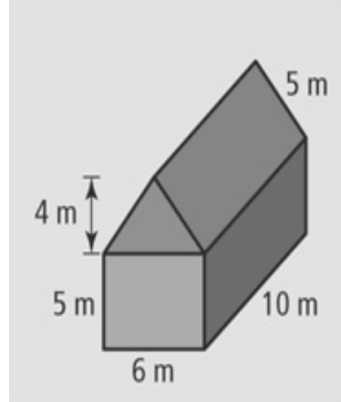
    r = 5 km
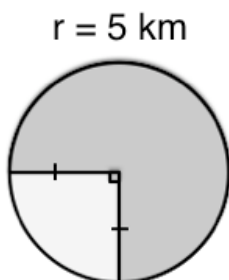
2. The composite figure below is made up of centimetre cubes. Determine its surface area.
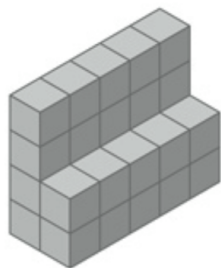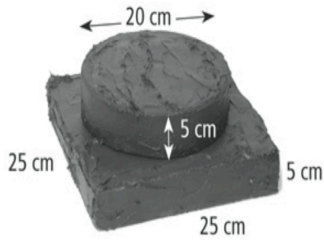
3. The composite object below is made up of cubes that are 3 cm x 3 cm x 3 cm. Determine the total surface area.
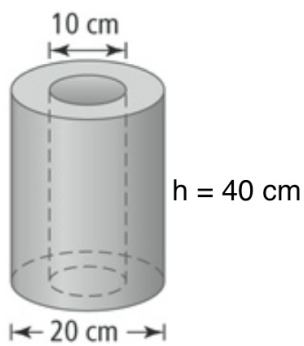
4. Determine the total surface area of the house in the figure below.
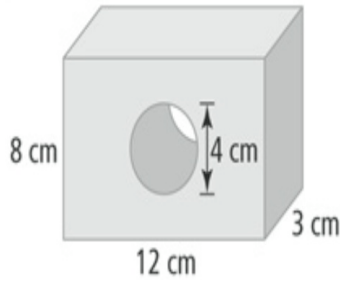

5. Calculate the surface area of the top and sides of the cake below that have been iced.


6. Find the surface are of the pipe in the picture below.

7. Determine the total surface area of the house in the figure below.

8 cm
4 cm
3 cm
12 cm

---

8. A parking lot uses concrete barriers to separate parking stalls. Each barrier is a rectangular prism with a length of 2 m, a width of 0.2 m, and a height of 0.2 m. The exposed areas of the barriers (top and 4 sides) are to be painted. A 4-L can of paint covers 20 m^2 and costs $30. How much will it cost to paint 120 barriers?

0.2 m
0.2 m
2 m
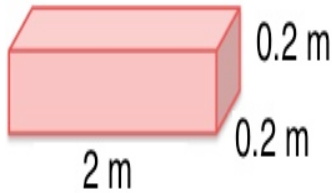
| 1. 58.8 km^2 | 2. 72 cm^2 | 3. 882 cm^2 | 4. 334 m^2 |
| 5. 1439.2 cm^2 | 6. 4398.2 cm^2 | 7. 356.0 cm^2 | 7. $240 |

Multiple Choice (30 marks) – Identify the letter that best answers the question by writing it in the box to the left of the choices.

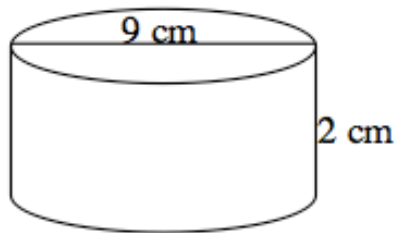1. The following shape has a $l = 15\ cm, w = 12\ cm, and\ h = 11\ cm.$ What is its surface area?

	a. 954 cm²	b. 1050 cm²	c. 1135 cm²	d. 1980 cm²
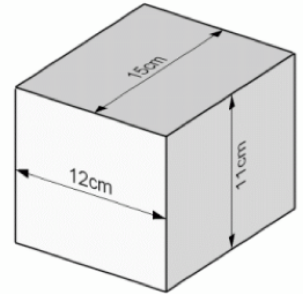
2. Determine the surface area of the following shape.

	a. 84.8 cm²	b. 129.3 cm²	c. 183.8 cm²	d. 622.0 cm²
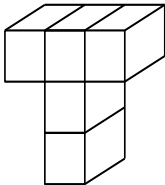
3. Determine the surface area of the shaded region.
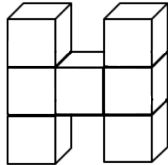
	a. 126.9 cm²	b. 145.7 cm²	c. 161.5 cm²	d. 240.0 cm²
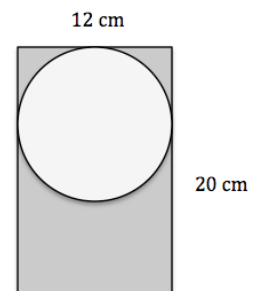
4. A composite object is made using centimetre cubes (1 cm x 1 cm x 1 cm). Determine the surface area of the object.

a. 19 cm^2 b. 21 cm^2 c. 22 cm^2 d. 30 cm^2	
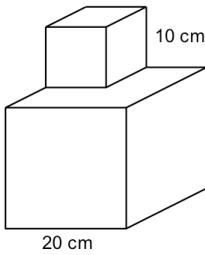
5. This object is made from centimetre cubes (7 in total). Determine the total surface area.

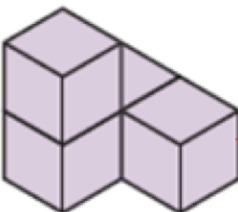|	
a. 22 cm^2 b. 26 cm^2 c. 30 cm^2 d. 42 cm^2	

6. Each cube below has a side length of 3 cm. What is the total surface area of all exposed surfaces of the figure below?
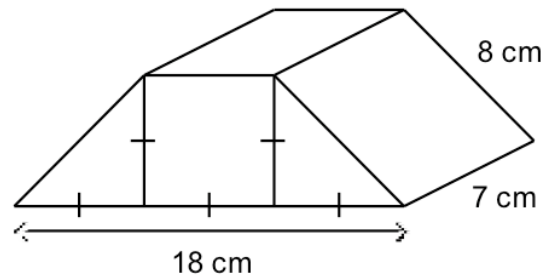
a. 148 cm^2 b. 154 cm^2 c. 162 cm^2 d. 168 cm^2	

7. This composite object is made of a 10-cm cube on top of a 20-cm cube. Determine its surface area.

|	
a. 2500 cm^2 b. 2800 cm^2 c. 2900 cm^2 d. 3000 cm^2	

10 cm

20 cm

8. This object is composed of two right triangular prisms and a square prism. Determine the surface area of the object.

|	a. 298 cm^2	b. 352 cm^2	c. 424 cm^2	d. 568 cm^2

8 cm

7 cm

18 cm

9. This object is composed of a rectangular prism on top of a cylinder. The rectangular prism has a height of 8 cm and square ends of side length 4 cm. The cylinder has a diameter of 16 cm and a height of 6cm. Determine the surface area of the object.

|	a. 630.7 cm^2	b. 815.7cm^2	c. 831.7 cm^2	d. 847.7 cm^2

4 cm

8 cm

6 cm

16 cm
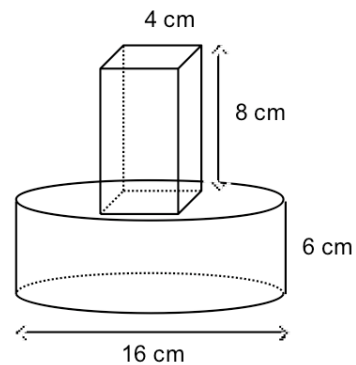
10. Find the area of the shaded region.

|	a. 150.8 mm^2	b. 175.9 mm^2	c. 201.1 mm^2	d. 226.2 mm^2

r = 8 mm
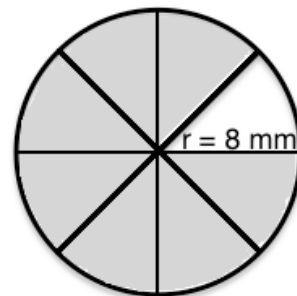
**Short Answer (15 marks) – Show all calculations and round answers to one decimal place.
Write your final answer with units in the box provided for full marks.**

1. A cylindrical hole (d= 4 cm) is drilled through a rectangular prism (6cm x 6 cm x 15 cm). What is the total surface area of the shape? (5 marks)
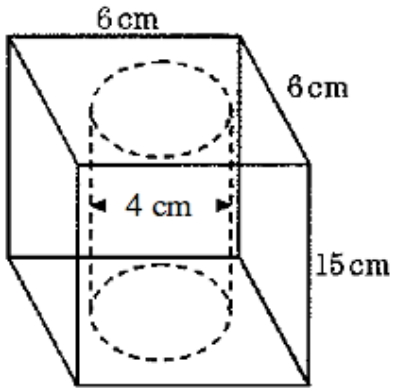
2. A room is measured 4.3 m long by 3.7 m wide by 2.1 m high. The ceiling and 4 walls need to be painted. A can of paint covers 15 m^2 and costs $20, how much will it cost? (5 marks)
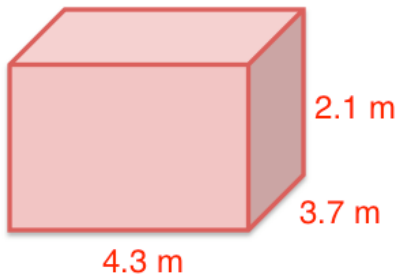
3. This birdhouse is to be hung from the branch of a tree. There is only one circular hole, on the front side that has to be a diameter of 8 cm. Determine the surface area of the outside of the birdhouse (all 7 sides) that needs to be painted. (5 marks)
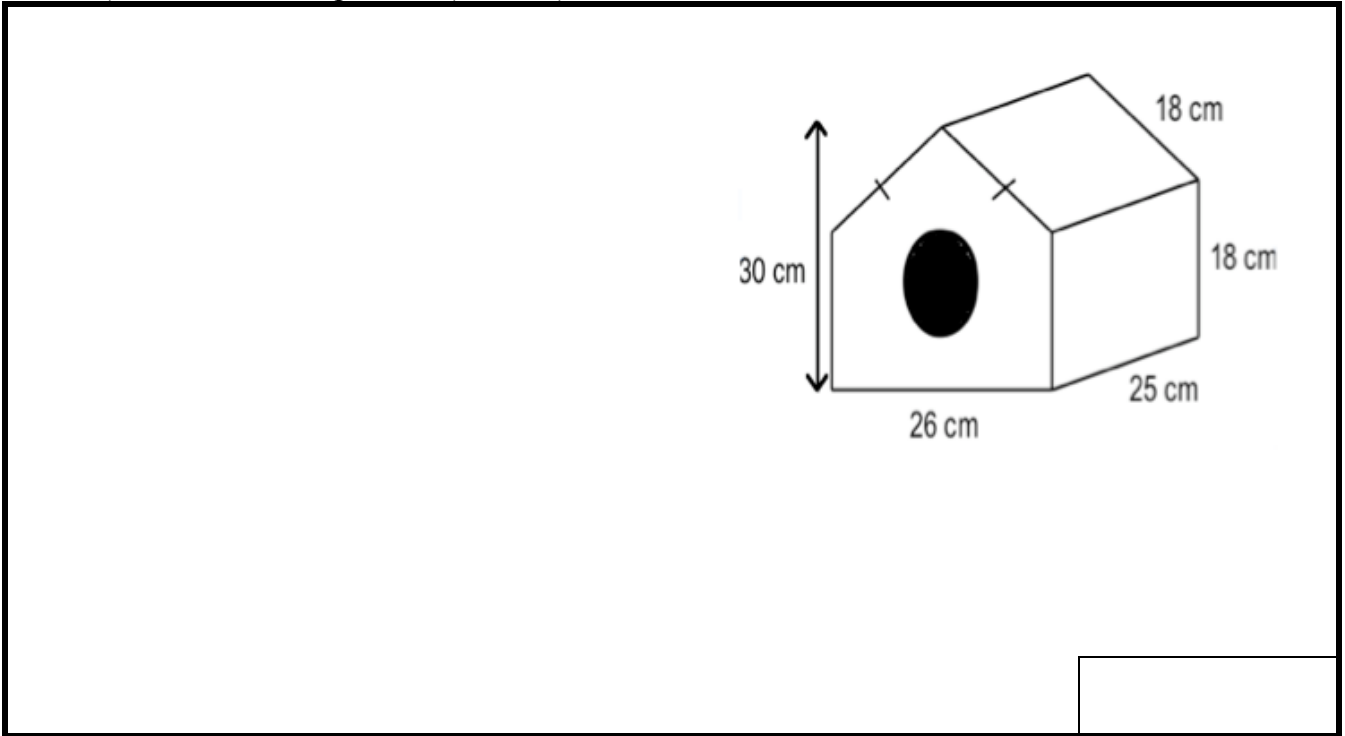
Bonus: A warehouse measures 60 m by 50 m by 20 m with and a storeroom that measures 40 m by 25 m by 10 m attached to the side. A 10 m by 15 m door does not need to be painted. Calculate the total surface area of the walls and roof that need to be painted.