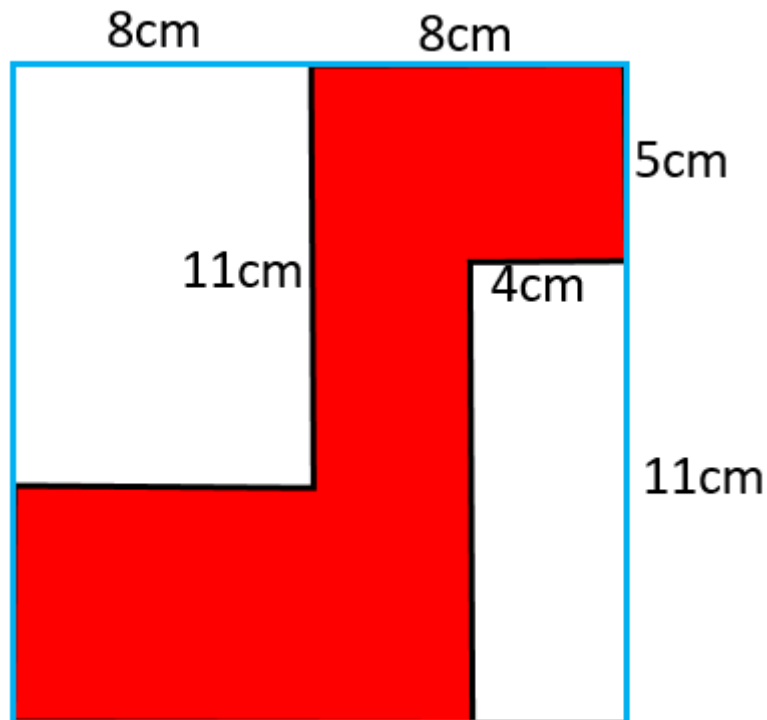


(1) Rather than split up this shape into three (or more) rectangles it can be considered as a square with two rectangles cut away.



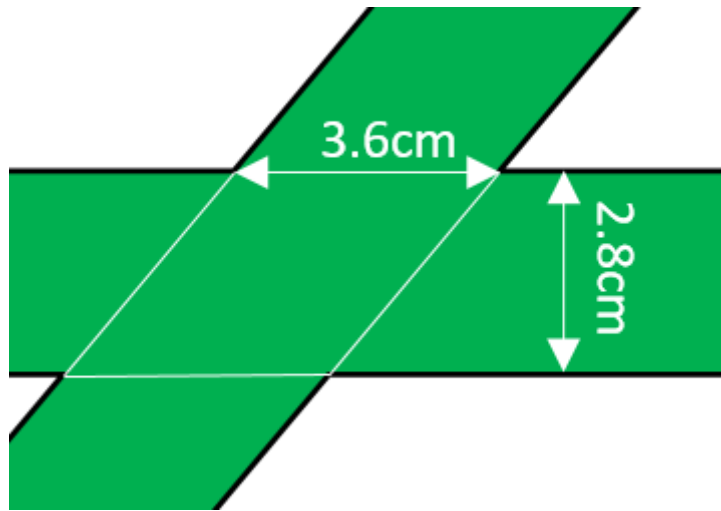
So the red area is the area of the square minus the areas of the two rectangles.

$$\text{Area} = 16 \times 16 - 11 \times 4 - 8 \times 11 = 124 \text{ cm}^2$$

(2) The area of a ring can be calculated by treating it as a small circle cut from a large circle. The text tells us that it is three quarters of a ring plus a triangle.

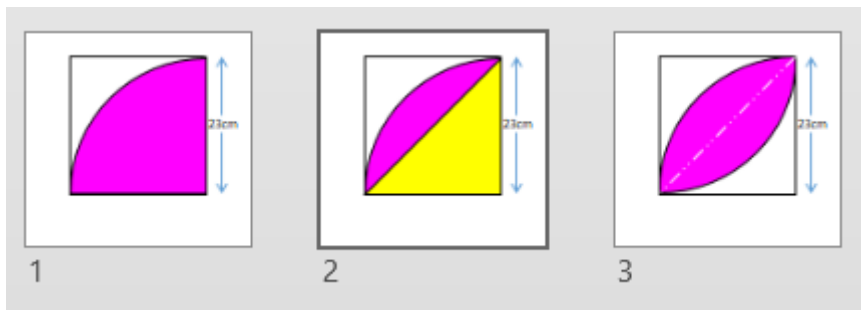
$$\text{Area} = \frac{3}{4}(\pi \times 7.5^2 - \pi \times 4^2) + \frac{1}{2} \times 9 \times 4 = 113 \text{ cm}^2 \text{ (to 3 sig figs)}$$

(3) The total area is three times the area of one green rectangle minus the two overlapping regions as they will have been counted twice! These regions are parallelograms with a height of 2.8 cm and base of 3.6 cm



$$\text{Area} = 3 \times 2.8 \times 20 - 2 \times 2.8 \times 3.6 = 147.84 \text{ cm}^2 \text{ (to 2 dec pl)}$$

(4) Begin by finding the area of a quarter circle radius 23cm



Next subtract the area of the yellow triangle to be left with the area of the segment shown in diagram 2. Finally double the area of the segment.

$$\text{Area} = 2 \left( \frac{1}{4} \times \pi \times 23^2 - \frac{1}{2} \times 23 \times 23 \right) = 302 \text{ cm}^2 \text{ (to 3 sig figs)}$$

(5) Let the width of a yellow rectangle be  $W$  and the length be  $L$

Two simultaneous equations can be solved to find  $W$  and  $L$

$$L + W = 16$$

$$3L = 5W$$

$$3(16 - W) = 5W$$

$$48 - 3W = 5W$$

$$8W = 48$$

$$W = 6$$

$$L = 10$$

So the area of the large composite rectangle is

$$\text{Area} = 16 \times 3 \times 10 = 480 \text{ cm}^2$$

(6) Let the width of an orange rectangle be  $W$  and the length be  $L$

The length of a side of the green square can be expressed as:

$$\text{Left side: } L + 84 - W$$

$$\text{Right side: } 96 + W - L$$

$$\text{Base: } 115 - W - L$$

As all of these represent the same length they can be use to set up two simultaneous equations:

$$L + 84 - W = 96 + W - L$$

$$L + 84 - W = 115 - W - L$$

These can be simplified to:

$$2L - 2W = 12$$

$$2L = 31$$

$$L = 15.5$$

$$W = 9.5$$

So the length of one side of the green square is

$$115 - 9.5 - 15.5 = 90$$

$$\text{Area} = 90^2 = 8100 \text{ cm}^2$$