

# SEVENOAKS SCHOOL



## YEAR 9 (13+) SCHOLARSHIP

May 2019

For entry in September 2019

## MATHEMATICS

Your Name: \_\_\_\_\_

Your School: \_\_\_\_\_

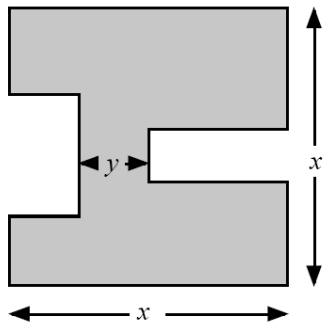
**Time allowed:** 1 hour

**Equipment needed:** Pen, pencil, lined paper and eraser.

### Information for candidates:

1. Calculators are NOT allowed.
2. Write your name and school on this page.
3. Write your answers on the **separate paper** provided. Please put your name on all the sheets of paper you use.
4. There are **10** questions in this paper. Attempt all of them.
5. Show working out for all questions. You **will not** get full marks unless you show method.
6. Leave your answers in their **simplest form**.
7. The marks for each question are indicated in square brackets [ ]. There are **40** marks on the paper.

1. If it is now 5.00 am, then what time will it be in 100 hours? [3 marks]
2. Rice costs more than wheat by 25% for the same amount. By what percentage is wheat cheaper than rice? [3 marks]
3. £53 is divided among Amin, Bob and Cheng in such a way that Amin gets £7 more than what Bob gets and Bob gets £8 more than what Cheng gets. What is the ratio of their shares? [4 marks]
4. The diagram shows a square of side length  $x$  with two rectangles cut out of it. Find the perimeter of the shaded shape in terms of  $x$  and  $y$ .



[3 marks]

5. Five positive whole numbers have the following properties:-

Their mean is 4

Their median is 2

Their mode is 2

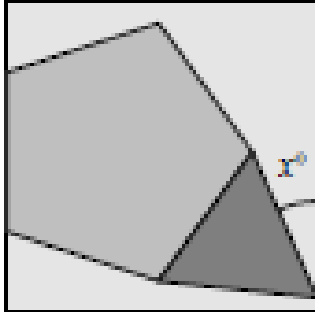
Their range is 6

What is the product of these five positive integers?

[4 marks]

6. The diagram shows a regular pentagon and an equilateral triangle placed inside the square.

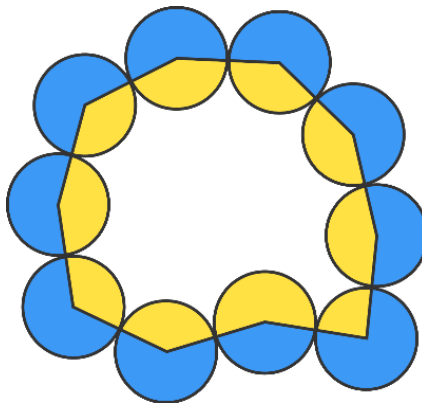
What is the value of  $x$ ?



[5 marks]

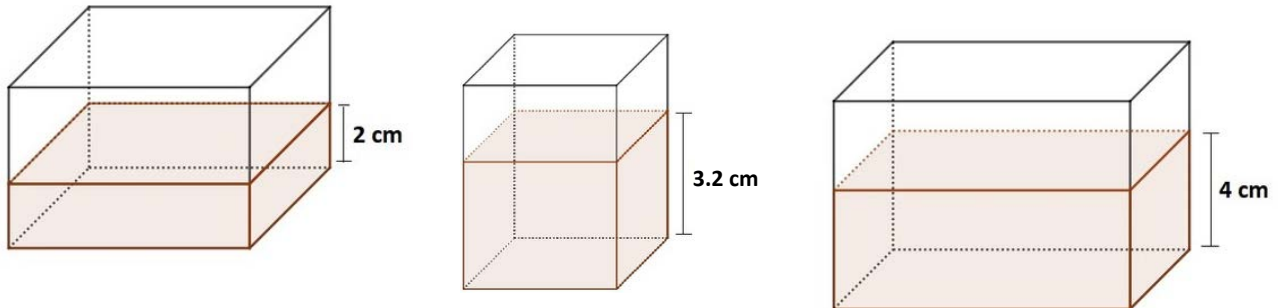
7. Initially 60% of all attendees in a school party were girls. A while later, with 8 girls and 12 boys gone, the number of girls became twice as many as the number of boys. What was the number of people initially present at the party? [5 marks]

8. Identical circles of radius 2 are externally tangential to one another as shown:-.



Connecting the centres of adjacent circles gives a ten sided polygon, which divide the circles into two areas blue: yellow. The positive difference between the blue and yellow areas is  $k$ . Find the value of  $k$ . [6 marks]

9. The three glass containers in the diagram are all the same except that they stand on three different sides. The amount of water in each container is 160 ml, and the heights of water in each case are 2 cm, 3.2 cm and 4 cm as shown. What is the volume of this container?



*Not drawn to scale*

[5 marks]

10. Given that  $2^x = 9$  and  $27^y = 2$ , find the value of  $3xy$ .

[2 marks]