

## GROUP ROUND INSTRUCTIONS

- Your team will have 40 minutes to answer 10 questions. Each team will have the same questions.
- Each question is worth 6 points. However, some questions are easier than others!
- You will have to decide your team's strategy for this group competition. Do you split up so that individuals work on a few questions each or do you work in pairs on a greater number of questions? Working all together on all the questions may well take too long. You decide!
- There is only one answer sheet per team. Five minutes before the end of the time you will be told to finalise your answers and write them on to the answer sheet. This answer sheet is the only thing that will be marked.



Senior Team Maths Challenge 2007  
Group Round



## *Question 1*

Consider the result of inserting two multiplication symbols between the digits 2, 2, 3, 3 and 3, in that order.  
For example,  $223 \times 3 \times 3 = 2007$ .

What is the largest number that can be made in this way?



## *Question 2*

A van travels from Leeds to Trowbridge with an average speed of 50 kilometres per hour. What average speed does it need to achieve on the return journey to make the average speed for the whole journey 60 kilometres per hour?



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### *Question 3*

Find all 4 real values of  $x$  that satisfy  $(x-5)^{x^2-4} = 1$ .



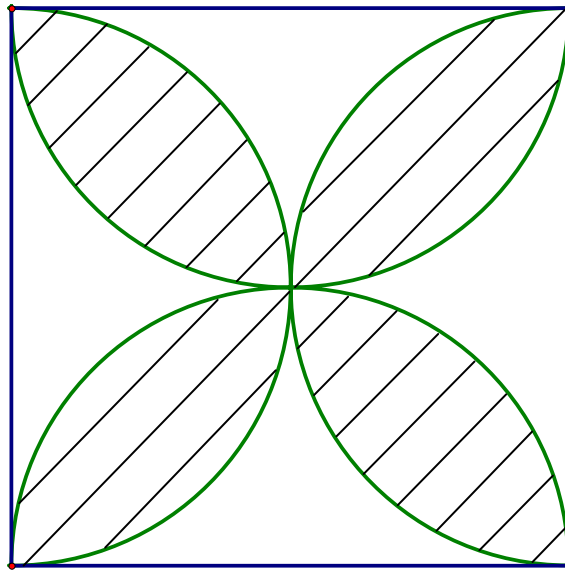
### *Question 4*

All the edge lengths of a particular cuboid are integers. It turns out that the cuboid's volume is numerically equal to its surface area. If the shortest edge length is 3cm, what is the maximum possible length of the longest edge?



### Question 5

The square in the diagram below has sides of length two units. The shaded sections are enclosed by 4 semi-circles. Calculate the exact value of the total area of the unshaded regions.



[Not to scale]



## *Question 6*

Four playing cards are placed on the table. The suit of each card is recorded. For example the cards might be Diamond, Heart, Heart, Spade in that order or Club, Club, Club, Spade. How many possible different results could have been recorded if we never had all four suits represented in the four cards dealt?



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## *Question 7*

$x \bullet y$  is defined to be  $xy - 10x - 10y + 110$ .

Find a number,  $x$ , with the property that  $x \bullet y = y$  for any number  $y$ .



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## *Question 8*

The product of five consecutive integers is 360 360. What is the mean of the integers?



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## *Question 9*

I have a number that is less than one million. Putting a 1 after it makes it three times as large as putting a 1 before it. What is my number?

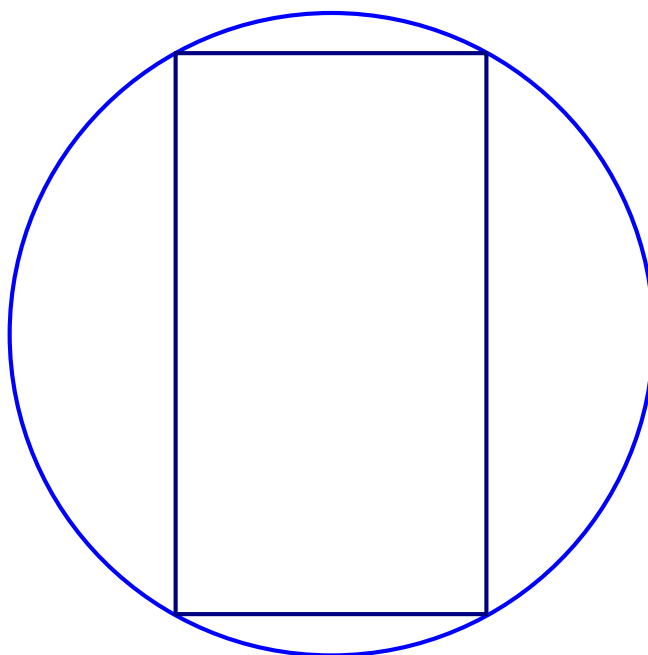


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### Question 10

The circle in the diagram has radius 6 cm. If the perimeter of the rectangle is 28 cm, what is its area?



[Not to scale]



**Senior Team Maths Challenge**  
**Group answer sheet**

**Team number .....**      **School / College name.....**

<b>1.</b> Largest number	<b>2.</b> Average speed  km/h
<b>3.</b> Four values of $x$	<b>4.</b> Max. length of longest edge  cm
<b>5.</b> Total area of shaded region  units <sup>2</sup>	<b>6.</b> Number of different results
<b>7.</b>  $x =$	<b>8.</b> Mean of the five integers
<b>9.</b> Number	<b>10.</b> Area of rectangle  cm <sup>2</sup>

Award 6 points for each correct answer:

TOTAL SCORE = \_\_\_\_\_



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