



OUNDLE

School

Academic Scholarship 2014

Mathematics

Paper 2

Time Allowed: **2 hours**

Calculators WILL be needed for this paper

Instructions to candidates:

- **The number of marks for each question is show in square brackets**
- You are not expected to have time to do all the questions.
- You may answer the questions in any order.
- **Choose those questions which you think you can answer best.**
- **Remember to show your working and clearly show the method you are using.**
- Take π as either 3.14 or the value on your calculator.
- Answers should be given to 3 significant figures where appropriate.
- Some questions are longer than others.



1. A fruit seller has 5 baskets of fruit, each containing a selection of both oranges and lemons. The numbers of fruits in the 5 baskets are 8, 11, 13, 18 and 23. The seller points to one of the baskets and says "If I sell that basket of fruit then I will have exactly double the number of oranges as lemons in the remaining 4 baskets". Which basket was the seller pointing to? [6]

2. A pack of 8 rugby players has a mean mass of 105kg. One player leaves the pack and is replaced by a player of mass 94kg. The mean mass of the pack is now reduced to 103kg. What was the mass of the player who left? [6]

3. A gang of robbers steal a sum of money which is a whole number less than £2000 from a shop and split the money equally between them. The money can be shared equally (in whole numbers of pounds) if there are 12, 30 or 42 robbers in the gang. Considering all possibilities, how much money could they have stolen? [8]



4. A fairground game requires players to throw darts to pop balloons. A player receives 2 darts in each turn and the probability of any dart popping a balloon is 0.6. What is the probability that a player, throwing 2 darts in his turn, pops one balloon only? [6]

5. A garage is 3m tall, 5m wide and 6m long. What is the length of the longest pole that can be fit inside the garage? [8]

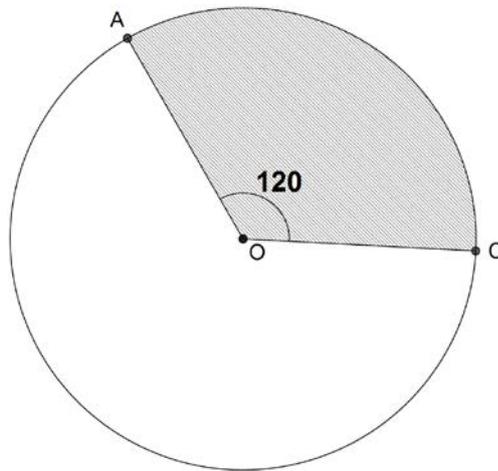
6. The points A and B have coordinates $(\frac{1}{2}, \frac{4}{3})$ and $(-\frac{2}{3}, \frac{1}{4})$ respectively.
- a. Find the gradient of the straight line through these points.
- b. Hence, find the equation of the straight line that passes through A and B, leaving your equation as simplified as you can. [10]

7. What is the sum of all integers which are between 100 and 1000 and which are divisible by 7? [12]

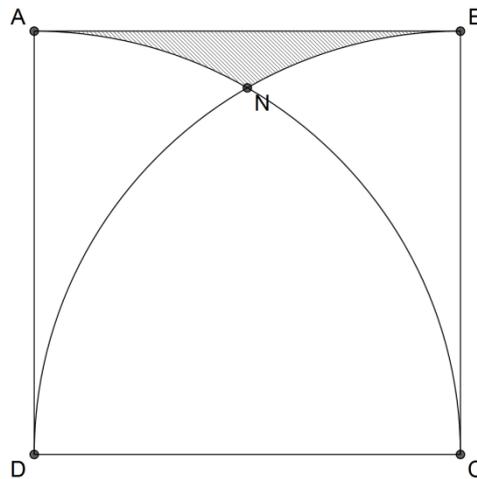
8. Furni found that, on his birthday in 1995, his age was one fifty-sixth of the year of his birth. How old will Furni be in 2014? [6]



9. a. The circle below has radius of length 6cm. Find the area of sector AOC.



- b. Find the area of an equilateral triangle with sides of length 8cm.
- c. ABCD is a square of side 4cm. The arc of a circle with centre C and passing through D and B is drawn. Another arc is drawn with centre D and passing through A and C. These arcs intersect at N. Find the shaded area ANB.



[16]

10. Dave chooses a set of numbers from the set positive integers less than 20. If the product of the numbers chosen for the set is not divisible by 6, what is the maximum number of members his set can contain?

[12]

11. Five points are placed in an equilateral triangle which has sides of length 1cm. Show that there are 2 points which are at most 0.5cm apart.

[10]

Total: 100 marks