ST EDWARD'S

OXFORD

13+ SCHOLARSHIP EXAMINATION 2013

MATHEMATICS
Paper 2

40 minutes

Name: _____

There are 4 questions; 30 marks available.

No Calculators are allowed.

Scrap paper is available.

1) At a party, everyone shook hands with everybody else.
    a. Four people arrived early and shook hands with each other – how many handshakes were there?

    b. Later in the evening, all of the guests had arrived. There were 66 handshakes in total. How many people were at the party altogether?

[5 marks]

2) My digital watch shows hours and minutes only. It is a 12 hour watch, so 6 pm is written as 06: 00 (**NOT** 18:00).
    a. When the clock shows 01:10, this a palindromic number (reads the same forwards as backwards). List the other palindromic times.
    b. For what fraction of a complete day is at least one "1" showing on the display?

[8 marks]

3) You see a £97 shirt, but don't have any cash, so you borrow £50 from your mum & £50 from your dad (i.e. a total of £100).

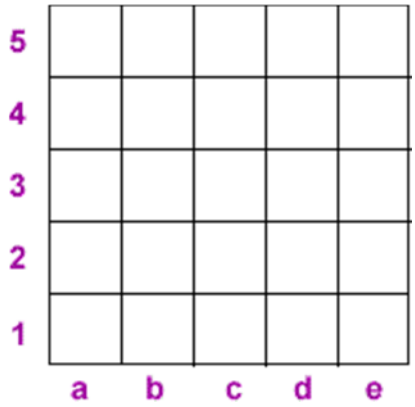
You buy the shirt and have £3 change so you give Mum £1, Dad £1 & keep the other £1 for yourself.

You now owe Mum £49 and Dad £49. £49 + £49 = £98 plus your £1 makes £99… so where is the missing £1?

If you think more money is missing, or don't think any money is missing at all, explain carefully why.

[5 marks]

4) Arrange all the whole numbers from 1 to 25 (inclusive) in the following grid using the clues below.



Clues:

Square numbers are in b5, b3, d3, b1 and c1.

Prime numbers are in a5, c5, e5, c4, a3, c3, e3, e2 and a1.

Triangular numbers are in d5, e4, d3, a1, e1 and c2.

Cube numbers are in d3 and b2.

Powers of 2 are in b5, b2, e2 and b1.

Palindromic numbers are in a5 and d1.

Factors of 100 are in b5, d5, c4, b3, d3, a2 and e2.

The median of all the numbers is in c3.

Row 3 and column c are all odd.

Numbers that are the same upside-down are in a5, d3 and b2.

Every horizontal row, vertical column and the main diagonals add up to 65.

Hints:

32123 is an example of a palindromic number

1, 3, 6, 10 are the first 4 triangle numbers

[12 marks]

END OF TEST