**Test and Interview Questionnaire**

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| **Year of Entry** | 2013 | **Year of Interview** | 2012 |
| **Course applied for** | Mathematics | | |
| **University** | Oxford University | | |
| **Interview** | | | |
| **College if applicable** | Trinity | | |
| **Interviewer(s)** | Dr Matthias Winkel and PhD student | | |
| **Questions (and answers)** | 1. Why mathematics? 2. Solve 2a2-b2=1 for a and b which are both real integers.   First solution of a and b both equal to 1. With some rearranging it is apparent that b must be odd. Then told to prove that a is also odd. As b is odd consider it as (2k+1) when put into the equation it is clear why a is therefore also odd. By trying values of different odd numbers another solution is a=5 and b=7.  3)  Given diagram on the right with 3 similar circles, radius of unit length, told to find the shaded area.  Equilateral triangle can be drawn with the centre of each of the circles as the corners. You can then work out the area of the equilateral triangle and then subtract the area of the sectors leaving you with the area of the shaded area.  Answer √3 – π/2   1. Same diagram as above but with a circle in the shaded area touching each of the circles. Find the radius of the small circle in the middle.   Answer ⅓(2√3)  Played a game with sticky notes. There were 13 sticky notes in a line on the table all of them were blank but the last one had a sad face on it. Myself and the PhD student took it in turns to take either 1,2 or 3 sticky notes at a time from the end of the line and the aim was to not end up having to pick up the sad face. We then played the game with a smiley face instead of the sad face and the aim was to get the smiley face. You get to choose who picks first.  With the sad face let them go first as you can then pick up all the multiple of fours forcing them to pick up the thirteenth sticky note which has the sad face on it. With the smiley face you should go first and pick up the sticky notes that are one more than a multiple of four enabling you to pick the smiley face and win the game. | | |
| **Interview** | | | |
| **College if applicable** | Trinity | | |
| **Interviewer(s)** | Dr Christopher Prior and PhD student | | |
| **Questions (and answers)** | 1. Differentiate x with respect to x2.   Answer 1/2x.  2) Differentiate xx  let y=xx  lny=xlnx  1/y dy/dx=lnx+1  dy/dx=y(lnx +1)  dy/dx=xx(lnx+1)  Draw a graph of xx for x greater than 0. Consider graph below x=1.  For x greater than 1 similar to an exponential graph. For x between 1 and 0 there is a minimum turning point which can be found by letting the gradient function equal 0.   1. How many corners and sides does a square have? How many corners and   sides does a 3 dimensional square have? How many corners and sides does a 4 dimensional square have? How many corners and sides does a square in n dimensions have?  When you go from one dimension to the next dimension the number of corners doubles so in n dimensions it has 2n corners. The number of sides that meet at a corner is equal to the dimension that you are in. So in n dimensions the number of sides will equal the number of corners times the dimension you are in and then divide by 2 as every side has to meet at two corners so you will have counted double the number of sides. Therefore number of sides is equal to 2n-1x n. | | |
| **Interview** | | | |
| **College if applicable** | Pembroke | | |
| **Interviewer(s)** | Dr Anderson and Dr Schlackow | | |
| **Questions (and answers)** | 1) Solve sin (2x)=cosx for all real numbers  2) write n chose k. Then write n+1 choose k in terms of n choose k.  3) Solve k=0nΣ(nk)xk(1-x)n-k | | |

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| **General Impressions of the University and college if applicable**  The college was nice. The JCR had movies playing all day and there were also board games left out for us. The accommodation and food was also very good. |
| **Impressions of current students whom you met**  They were friendly and helpful even if you had interviews at other colleges they would bring you there so you didn’t have to worry about getting lost. |
| **Any other advice or practical tips for future interviewees in your subject or at this college** |