Investigation Guide B: Highest Number 1

1. Probability

   In each of the following games there is just one roll left.

   Imagine you are hoping to get a higher score than your opponent.

   - Describe your chances of winning in each game.
   - In which games do you have the best chance?

Opponent	You	Opponent	You
i) 5, 3, __	__ , 4, 1	ii) __ , 4, 2	5 , 4, __
iii) 6, __ , 1	__ , 4, 1	iv) 6, __ , 2	6 , 4, __
v) __ , 5, 3	4, __ , 3		

2. Fund Raising

   Imagine the game set up at a school fair to raise money. You charge each person $1 to play, and offer a prize of $5 value if a certain score is reached. This stem & leaf graph shows the totals of 50 players:

31	03
30	27 48 52
29	31 57
28	61
27	61 37 43 46 19 71 88 03
26	14 66 62 00 17 31 29 80
25	31 36 48 92 67 69
24	28 82 40 73
23	83 79 21 50
22	74 56 17
21	46 51 83 99 16
20	31 92
19	46 58
18	
17	21

   i) what score would be 'break even', ie: neither win or lose money?

   ii) what score would you advertise to win a prize?

   iii) suppose there are 300 expected players. How much profit or loss would you appear to make for each of these 'cut-off' scores?

   3,200 3,100 3,050 2,500 2,900 2725

   iv) explore altering both the entry and the prize - write down several possibilities and a break even 'cutoff score' for each.

3. Extensions

   i) Investigate the game if you took away the restriction of using each number only once. For example you could now score 666 (or 111). What strategies might now be the best? How would this effect the fund raising situation?

   ii) Investigate strategies for a 4-digit game, ie: the place value positions are ones, tens, hundreds and thousands.