**Troublesome Dice**

**What different scores could Jenny and her family get?**

Possible pairs of numbers:

1+2=3

1+3=4

The number 7 doesn’t appear, as it is the sum of all the opposite numbers on a dice. There are 12 different combinations, and the table below shows how they are split up within the numbers.

1+4=5

1+5=6

2+3=5

2+4=6

2+6=8

3+5=8

3+6=9

4+5=9

4+6=10

5+6=11

**Can the scores be allocated fairly?**

Yes, the scores can be allocated fairly with 3 people in the family.

|  |  |
| --- | --- |
| 3 | | |
| 4 | | |
| 5 | || |
| 6 | || |
| 8 | || |
| 9 | || |
| 10 | | |
| 11 | | |

The following table shows how many times each combination/number can appear when the dice lands edge up…

Altogether there are 12 possible combinations, with certain totals appearing more than once, increasing the chances of those numbers appearing.

If we divide 12 by 3 (the number of people in the family) then each person can get 4 combinations. Therefore we can say…

Person 1: Gets totals 3(1), 4 (1), 5(2) = 4 combinations

Person 2: Gets totals 6(2), 8(2) = 4 combinations

Person 3: Gets totals 9(2), 10(1), 11(1) = 4 combinations

This way each person has an equal chance of getting the last slice of pie.

If there were 4 people at the table the combinations could be split like this…

Person 1: Gets totals 3(1), 5(2) = 3 combinations

Person 2: Gets totals 4(1), 6(2) = 3 combinations

Person 3: Gets totals 10(1), 8(2) = 3 combinations

Person 4: Gets totals 11(1), 9(2) = 3 combinations

If there are 5 people then the combinations cannot be split equally.

If there are 6 people, then the combinations can be split fairly:

Person 1: Gets totals 3(1), 4(1) = 2 combinations

Person 2: Gets totals 5(2) = 2 combinations

Person 3: Gets totals 6(2) = 2 combinations

Person 4: Gets totals 8(2) = 2 combinations

Person 5: Gets totals 9(2) = 2 combinations

Person 6: Gets totals 10(1), 11(1) = 2 combinations

**How could the scores be allocated fairly if the dice lands corner up?**

The scores could not be allocated if the dice were to land corner up as there would be 8 different combinations and 3 members of the family meaning they can’t be split fairly.

