**Chapter 1: Combinatorics Assignment**

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*Simple familiar*

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|  | A swimming carnival consists of 7 different freestyle events, 3 different backstroke events, 3 different breast stroke events and 3 different butterfly events.  If a swimmer must compete once in each stroke, how many event combinations are possible? |  |  |
|  | A café has a choice of 3 entrees, 5 main meals and 4 desserts. If a customer intends on having one of each course, how many different 3-course meals are possible? |  |  |
|  | A softball captain wants to arrange the 9 players in the team in batting order. How many batting orders are possible? |  |  |
|  | A theatre company needs 8 jobs to be completed for an upcoming production. The team of 8 staff are each randomly assigned one of the eight jobs to complete. How many different job arrangements are possible if only Jack or David can be assigned the job of directing. |  |  |
|  | Evaluate  by using the formula. |  |  |
|  | 8 people sit around a circular table.   1. Calculate total arrangements 2. Calculate the number of ways of 2 friends sitting together 3. Calculate the number of ways separating two disagreeable people being apart |  |  |
|  | Solve the equation  for *n*. |  |  |
|  | In the game of Scrabble, each player is issued with 7 letters. If a player receives the letters  ‘O, O, E, E, S, G, H’, what is the number of different arrangements using all seven letters and beginning and ending in ‘E’? |  |  |
|  | A tourist operator offers a trip to Sydney via any of 3 different bus companies, 8 different aeroplane flights, use of 2 different hire cars, or 2 different trains. How many different return trips to Sydney are possible if you change your mode of transport on the return trip? |  |  |
|  | To access a safe requires selecting 4 numbers in the correct order between 1 and 60. Calculate the number of different possible combinations. |  |  |
|  | A baseball team takes 12 players to a game but only 9 are allowed to bat.   1. How many different batting orders are possible? 2. If one designated hitter always bats at number 2 and another at number 4 in the batting order, how many different batting orders are now possible? |  |  |

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|  | Solve for *n* in . |  |  |
|  | A team of 5 debaters is randomly chosen from a group of 8 boys and 3 girls.  Calculate the probability the team has exactly 1 girl. |  |  |
|  | A nursery worker plants 5 identical pumpkin seedlings, 3 identical tomato seedlings and 4 identical zucchini seedlings in a row. Calculate the number of arrangements possible in the row. |  |  |
|  | A is the set of even numbers and B is the set of numbers divisible by 7. How many numbers from 1 to 100 are not in either set. |  |  |

*Complex unfamiliar*

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|  | A numberplate contains 6 randomly selected characters (letters and numbers) that can be repeated.  Determine the probability of a random plate containing exactly 4 unique letters and 2 identical numbers in any order. |  |  |
|  | A poker hand (5 cards) is dealt from a deck of 52 cards. What is the probability of at least 3 aces? |  |  |