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| Name:  Class: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date:\_\_\_\_\_\_\_\_\_\_ |
|  | **Year 12 Essential Mathematics**  **Investigation 2, 2019**  **Topic – Probability** | / 30  % |

Of 3.6 million Australians who report having Food insecurity (the lack of having access to regular sources of food), 652,000 of these people receive support from Foodbank type suppliers each month. Of these people, 27% are children.

Our school wants to run a lunch program for students who are hungry, but do not know how many are at risk. Rather than survey students, they decide to run a simulation for all 5 Year 12 General Mathematics classes, to determine whether offering a foodbank lunch food is necessary.

Knowing the **expected probability** is one in six (1 in 6) state-wide, **create a simulation of the probability**, t*o find out how many students in each class of 26 would require a meal at lunch*? You will need to briefly outline the process, conduct the simulation, then make recommendations to answer the question. Be sure to discuss if there is any bias in your report, and why we should run a simulation instead of another type of data collection. Lastly, you will need to state if the school should run a foodbank, and how many meals should be supplied each day.

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| **Description** | **4** | **3** | **2** | **1** | **0** |
| **Simulation** | Correctly uses dice to simulate data and records all rolls for all 5 classes individually.  **OR**  Uses digital random number generator for 5 | Correctly uses dice to simulate data for 4 classes | Correctly uses dice to simulate 3 classes worth of the data | Uses dice to simulate 2 classes worth of data | Simulates some data. |
| **Expected values** | Identifies 4 students and recommends 20 meals be supplied.  Compares results to this expected probability | Identifies that 4 students are 1 in 6 in a class of 26.  Mentions need for 20 meals | Does not mention 20 meals for year 12 classes  Mentions number of meals equal to 5 times their number | Identifies number of students incorrectly | Does not identify number of meals for each class  Does not mention 5 times the found number |
| **Description of process** |  | Outlines in detail how their simulation allows them to effectively model hungriness in school population. | Outlines how their simulation can be used to represent hungriness in a class | Says their simulation is representation of the population | Does not discuss how their simulation represents a population |
| **Representation of data** |  | Records data in an appropriate table or manner to make their results clear and legible.  Has all 5 classes separated and discusses how data is different. | Records data in an appropriate table or manner to make their results clear and legible.  Has all 5 classes included. Does not mention how data could be different between classes | Records all data generated, but does not generate a full 5 sets. | Generates 1 or 2 class data sets only, and uses this to base their response off. |
| **Conclusion** | Uses data to correctly make a recommendation about whether the school should run a foodbank, but also communicates that the simulation does not represent the real world, and because it is a simulation.  Makes reference to law of large numbers, and that by running a small sample creates an inaccurate representation | Uses data correctly to make recommendation.  Discusses how the simulation could represent the school, but states it as fact.  Does not mention law of large numbers, but does recognise that small number of simulations does not make for accurate data | Makes recommendation based on data, but does not refer to inaccuracies in the simulation effecting the results.  Does not mention how small simulation number or size affect overall results. | Makes recommendation, does not use the data in their analysis, but rather offers another solution. | Does not use the data in making their recommendation. |
| **Presentation** | 1 EACH | | Neatly written  Accurate | | |

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