[exam review – MDM4U]

1. Evaluate each expression:
   a. $_8P_0$
   b. $_4P_2 \times 3!$
   c. $\frac{9!}{5!4!} \times \frac{5 \times 4!}{3!2!}$

2. How many arrangements are there of the letters for each word given?
   a. FRIENDS
   b. REHEARSAL
   c. BELLEVILLE

3. In how many ways can eight members of the board of directors of Pride International Corp be seated around a round table in the board room?

4. Evaluate each expression:
   a. $\binom{10}{3}\binom{7}{2}\binom{4}{3}\binom{2}{2}$
   b. $_7C_2 \times 5!$
   c. $_8C_7$

5. Data obtained from a survey of families were reported as follows:

   114 eat meat at least once every day
   100 eat bread at least once every day
   70 eat fruit at least once every day
   48 eat meat and bread once a day
   27 eat bread and fruit once a day
   17 eat all three of these foods once a day

   a. What is the minimum number of families that were surveyed?
   b. How many of these families did not eat meat on a daily basis?

6. There are 16 teams entered in the Theatre Games tournament. In how many ways can first, second, and third place ribbons be warded to the teams?

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7. Use the binomial theorem to find the first four terms in the expansion of:

$$(2x - x^{-1})^9$$

8. The game "Dungeons & Dragons" is played with a dodecahedral die, that is, a die with twelve faces. What is the probability of rolling a number greater than 7?

9. A group of 12 people is going out on the town Saturday night. The group will take three cars with four people in each car. If they distribute themselves among the cars at random, what is the probability that Rafael and Chantal will be in the same car?

10. If a five minute segment is chose at random from a full length movie, the probability that it contains a violent scene is 0.4. The probability that it contains a humorous scene is 0.3, and the probability that it contains both a humorous and a violent scene within the five minute segment is 0.1. Find the probability that a five minute segment chosen at random from a movie contains either violence or humour.

11. In a recent Canadian census it was discovered that among all of the families in Canada, 40% have no children, 25% have one child, 18% have two children, 10% have three children, 5% have four children, and 2% have five or more children. If a Canadian family is selected at random, what is the probability that:

    a. The family has more than two children?
    b. The family has more than two children, given that it has at least one child?

12. What is the probability of throwing a number greater than seven with two dice knowing that the first die rolled is a 5?

13. Shaun and his tennis partner, Scott, win a doubles tennis tournament. Their win allows them first selection from the prize table. However, the prizes are indistinguishable from each other because all of the prizes are identically wrapped. There are three prizes worth $50.00, two prizes worth $25.00, and five worth $10.00. What is the expected value of the prize that Shaun and Scott receive?

14. In a manufacturing process, it is estimate that only 2 percent of the bolts that are machined are declared defective, that it, they are either to large or too small. In a package of 50 bolts, what is the probability that there is at least one defective bolt.

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15. If in a recent poll indicated that the Hippopotamus party had 9% popular support, what would be the expected number of people that a television interviewer must survey to obtain the opinion of a Hippo supporter?

16. Adam recently moved and was curious to know the average commuting time for him to get to work. He recorded the following times, in minutes:

| 55 | 68 | 83 | 59 | 68 | 75 | 62 | 78 | 97 | 83 |

    a. Find the mean, median, and mode.
    b. Find the mean deviation.
    c. Find the standard deviation.

17. The following data represents 20 people's estimates of how many jelly beans are in a large jar.

| 650 | 400 | 500 | 600 | 700 | 500 | 600 | 700 | 450 | 750 |
| 1000 | 550 | 625 | 575 | 750 | 900 | 650 | 700 | 575 | 800 |

Determine the median and interquartile range.