Complementary Events

Level 1 – 2

1. State whether the following are complementary events

   a) Getting an even number, getting an odd number when rolling a die.   Yes / No

   b) Getting a prime number, getting an even number when rolling a die.   Yes / No

   c) All students attend class, no students attend class.   Yes / No

   d) It will rain tomorrow, it will be sunny tomorrow.   Yes / No

   e) I will pass the exam, I will fail the exam.   Yes / No

   f) All members have different birthdays, two members have the same birthday.   Yes / No

   g) All members have different birthdays, at least two members have the same birthday.   Yes / No

2. The probability that it will rain tomorrow is $\frac{1}{3}$. Determine the probability that it will not rain tomorrow.

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3. The probability that I will cycle to work is $\frac{1}{2}$. The probability that I will take the train is $\frac{1}{3}$. Determine the probability that I will neither cycle nor take the train.

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4. The probability that a football team will not win a game is $\frac{1}{8}$. Determine the probability that a team will draw or win a game.

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5. The probability that it will rain on any given day is $\frac{1}{10}$. Determine the probability that is will rain on at least one day during the next seven days.

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6. Determine the probability that at least two people from a group of four share the same birthday. You may assume that nobody was born on a leap year.

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7. Steven is waiting for his two friends Stephen and Stefan at the arrival lounge of an airport. They arrived on a flight which had a total of 100 passengers. The passengers randomly enter the arrival lounge one-by-one. Determine the probability that either Stephen or Stefan (or both) are part of the first 10% of passengers to enter the lounge.

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8. Chandrakishore plays the lottery every week. Every time he plays he has a 1% chance of winning a prize. Determine the probability he will win something if he plays for 100 weeks.

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9. A biased die is such that the probability of rolling at least one even number when rolling the die five times is equal to $\frac{781}{1024}$. Determine the probability of rolling an even number when rolling the die once.

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10. A racing driver needs at least two points altogether in the next three races to win the championship. In each race he gets five points for first place, four points for second place, three points for third place, two points for fourth place, one point for fifth place, and no points for anything lower than fifth. Each race he has a 30% chance of finishing in the top five. If he does finish in the top five he has an equal chance of finishing first, second, third, fourth or fifth. Determine the probability he will win the championship.

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11. When a certain species gives birth to ten newborns the probability that there is at least one male is equal to 90%. Determine the probability of a single newborn being male.

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12. Determine the minimum number of times you have to flip a coin in order for the probability to get at least one tail to exceed 99%. Plot a graph using a GDC to help you answer this question. Sketch the graph below.

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13. Determine the minimum number of students needed in a class for the probability that at least two students share the same birthday to exceed 50%. Plot a graph using a GDC to help you answer this question. Sketch the graph below.

Hint: You may need to use the function $^nP_r = \dfrac{n!}{(n-r)!}$. *This is in the MATH menu on your GDC.*

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14. When a certain species gives birth to ten newborns the probability that there are newborns of both genders is equal to 35%. A newborn is more likely to be male than female. Determine the probability of a single newborn being male. Plot a graph using a GDC to help you answer this question. Sketch the graph below.

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15. In 2014 there were 21 flights worldwide out of approximately 37 million which experienced accidents resulting in the death of passengers. If these statistics remain the same each year determine how many flights you would have to take in order for the probability to experience a fatal accident to first exceed 50%. Plot a graph using a GDC to help you answer this question. Sketch the graph below.

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