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| Year  10 | | *Two and Three Stage Events* | Calculator Allowed | | |
| **Skills and Knowledge Assessed:**   * Describe the results of two­ and three­step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246) * Use the language of ‘if ....then, ‘given’, ‘of’, ‘knowing that’ to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247) | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Longer Answer Assessment | | | | | |
| Write all working and answers in the spaces provided on this test paper. | | | | | |
|  | | | | | **Marks** |
|  | | In a board game, two dice are rolled together. One die is six sided with the letters A, B, C, D, E and F on the faces and the other die is four sided with the numbers 1, 2, 3 and 4 on the faces. | | |  |
|  | | 1. Complete the grid below to give the possible outcomes.  |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 | 4 | | A |  |  |  |  | | B |  | B2 |  |  | | C |  |  |  |  | | D |  |  |  |  | | E |  |  |  |  | | F |  |  |  |  | | | | **2** |
|  | | 1. What is the probability of rolling B2?   ………………………………………………………………………………………………. | | | **1** |
|  | | 1. What is the probability of rolling an A or a C with an even number?   ………………………………………………………………………………………………. | | | **1** |
|  | | 1. What is the probability of rolling a combination which does not have an A or a 2?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | | | **1** |

|  | | **Marks** |
| --- | --- | --- |
|  | A sample of males and females are asked if they prefer to talk or text on their phones.  The results are shown in the table.   |  |  |  |  | | --- | --- | --- | --- | |  | Male | Female | Total | | Talk | 24 | 18 |  | | Text | 26 | 32 |  | | Total |  |  |  | |  |
|  | 1. Complete the totals in the table. | **2** |
|  | 1. If one person is chosen at random from the sample. What is the probability that they prefer to text?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that a person chosen at random is a female who prefers to talk?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. A person who prefers to text is chosen at random. What is the probability that they are male?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. A male is chosen at random. What is the probability that he prefers to talk?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |

|  | | **Marks** |
| --- | --- | --- |
|  | A two digit number is to be created using the digits 2, 3, 4 and 5 allowing repetition.  For example the numbers could be 45, 22, 34 etc. |  |
|  | 1. Draw a tree diagram to show all the possible numbers that can be created. | **2** |
|  | 1. What is the probability that the number created is an even number.   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that the number created is not a multiple of 3?     ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that the number created is greater than 30 and an even number?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. Given that the number is less than 50, what is the probability that it is a multiple of 3?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |

|  | | **Marks** |
| --- | --- | --- |
|  | Freddie has 5 songs on his phone, which we will abbreviate as M, N, O, P and Q. He randomly chooses two different songs to play on his way home. |  |
|  | 1. Draw a tree diagram to show the possible choices of the two songs and the order in which they are played. | **2** |
|  | 1. What is the probability that the songs are M and O in either order?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that the two songs are either P and Q or M and N?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that P is not included?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. Given that one of the songs is Q, what is the probability that the other is M?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |

|  | | **Marks** |
| --- | --- | --- |
|  | A young couple are planning on having three children. If they are successful, a tree diagram can be used to show the possible outcomes for the three child family. |  |
|  | a) Draw the tree diagram. | **2** |
|  | 1. What is the probability that two eldest children are boys?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that the two youngest children are the same gender?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. What is the probability that the first and last children are the same gender with the middle child different?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
|  | 1. Given that the first child is a different gender to the second, what is the probability that there are two boys?   ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |

*Two and Three Stage Events*

ANSWERS

|  |  |  |
| --- | --- | --- |
|  | |  |
|  | a)     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 | 2 | 3 | 4 | | A | A1 | A2 | A3 | A4 | | B | B1 | B2 | B3 | B4 | | C | C1 | C2 | C3 | C4 C4 | | D | D1 | D2 | D3 | D4 | | E | E1 | E2 | E3 | E4 | | F | F1 | F2 | F3 | F4 | | 2 |
|  | b) P(B2) | 1 |
|  | c) P(A or C with even) = | 1 |
|  | d) P(no A or 2) = | 1 |
|  | a)     |  |  |  |  | | --- | --- | --- | --- | |  | Male | Female | Total | | Talk | 24 | 18 | 42 | | Text | 26 | 32 | 58 | | Total | 50 | 50 | 100 | | 2 |
|  | b) P(Text) = | 1 |
|  | c) P(Female and Talk) = | 1 |
|  | d) P(Male given Text) = | 1 |
|  | e) P(Talk given male) = | 1 |
|  | a) | 2 |
|  | b) P(Even ) = | 1 |
|  | c) P(Not multiple of 3) = 1 – P(Multiple of 3)  = | 1 |
|  | d) P(Greater than 30 and even) = | 1 |
|  | e) P(Multiple of 3 given less than 50) = | 1 |
|  | a) | 2 |
|  | b) P(M and O) = | 1 |
|  | c) P(P and Q or M and N) = | 1 |
|  | d) P(P not included) = | 1 |
|  | e) P(M given Q) = | 1 |
|  | a) | 2 |
|  | b) P(BB any) = | 1 |
|  | c) P(any BB or anyGG) = | 1 |
|  | d) P( BGB or GBG) = | 1 |
|  | e) P(2 B given first 2 different) = | 1 |