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| EGC_Black | | Mathematics Essentials 2018  Unit 3/4 Test 4  Task Weighting: 8% | | |
| Student Name: |  | | TOTAL 57 Marks MmMarks |

Time Allowed: 10 Minutes Marks: 14

**Calculator Free** **No calculator or notes permitted for this section.**

### Question 1 (2 marks: 1, 1)

Consider the word **PROBABILITY.** A letter is picked from this word at random.

1. What is the probability of picking a letter I?
2. What is the probability of picking a vowel?

**Question 2 (2 Marks)**

Express the probability of the following situation using the appropriate method shown:

Choosing a blue jellybean from a jar containing 7 red, 5 green and 4 blue jellybeans

1. Word \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Fraction\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Decimal\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Percentage\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 3 (2 Marks)**

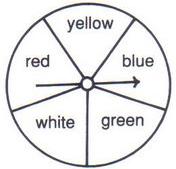
Provide a real life example/situation where probability is used to make a decision or decisions. Explain your answer

**Question 4 (1 Marks)**

Mines Rovers Colts have won 3 of their 12 games (as of round 15). What is their relative frequency of winning?

**Question 5 (3 Marks)**

There are 450 coloured sweets in a bag. Use the spinner below to answer the questions.



1. Calculate the number of blue sweets.

(b) How many sweets are NOT blue or yellow.

**Question 6 (2 Marks)**

Tomorrow’s weather forecast includes the statements: The probability of strong winds is 70%. The chance of rain is . Which event, strong winds or rain is more likely to occur? Justify with calculations.

**Question 7 (2 Marks)**

The musical group, Boyz II Men, has three members.



In the picture above, they stood in the order Wanya, Nathan and Shawn. Display a sample space to show the different combinations showing different ways in which they could stand in line before taking a photo.

End of Calculator Free Section

Time Allowed: 45 Minutes Marks: 40

**Calculator Assumed - Calculators and files are allowed in this test.**

***Show all working to maximise marks.***

**Question 8 (4 marks – 1, 1, 1, 1)**

1. Complete the table to show the sample space of the event of throwing two six sided dice and multiply the numbers together.

1st dice

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** |
| **1** |  |  |  |  |  |  |
| **2** |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |
| **4** |  |  |  |  |  |  |
| **5** |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |

2nd Dice

1. Calculate the probability that the answer is less than 12.
2. Calculate the probability that the answer is a square number.
3. What is the probability that the answer is greater than 36?

**Question 9 (5 Marks)**

Brodie **ALWAYS** orders from the following items when he eats at McDonalds; a Big Mac or a Quarter Pounder to start, then either a Chocolate, Caramel or Strawberry Mega Choc Waffle Cone and finally either a Coke or Fanta to wash it down.

If Brodie goes to McDonalds twice a week for 3 weeks how many Chocolate Mega Choc Waffle Cones would you expect Brodie to eat? Justify by demonstrating the sample space.

**Question 10 (7 Marks: 2, 1, 1, 3)**

In basketball a player can shoot one of 3 shots; a 2 pointer (worth 2 points), a 3 pointer (worth 3 points) or a Free Throw (worth 1 point). A player’s shooting percentage is the probability of making that shot.

If Tiani has a 2-Point field goal percentage of 46%, a 3-Point field goal percentage of 30% and a Free Throw percentage of 80%. Calculate:

1. How many Free Throws would you expect to be successful from 56 shots?
2. How many 2-Pointers would you expect to be successful from 21 shots?
3. How many 3-Pointers would you expect to be successful if 15 were shot?
4. Zac rates himself as a 3-point shooter (3-Point field goal percentage of 35%) but Tiani thinks differently. Tiani challenges Zac to a shootout and says that with 20 shots she could outscore Zac by shooting only 2 pointers, with Zac only shooting 3 pointers. Is she correct? Justify with calculations

**Question 11 (5 marks)**

Two cards are drawn at random from a set of five playing cards. They are :

10 , Jack , Queen , King and Ace

After the first card is drawn, it is **not** returned to the pile.

1. Draw a tree diagram to display all possible combinations of the two cards that could be selected.
2. Hence calculate the probability that,
3. An Ace is one of the two cards drawn
4. A Jack is drawn first
5. A Jack and a Queen are drawn

**Question 12 (10 Marks 1, 2, 3, 2, 2)**

Supposing that Ebola has a 70% fatality rate for those infected.

1. If there are 20 people in a hospital currently being treated for Ebola, how many of those people would you expect to die?
2. In a village that has 15 people infected with the virus, how many of these are expected to survive?

You are studying the 20 people in hospital with the virus and want to conduct a simulation to determine what will happen to them.

1. Describe in detail how you could set up a simulation. For each person, how will you determine whether or not they die?
2. How many trials of the simulation would you run? Explain your reasons.
3. Does this simulation guarantee to give you an accurate picture of what will happen? Explain.

**Question 13 (7 Marks: 2, 2, 2, 1)**

This game is based on tennis but uses a coin and a six-sided die. There are two players, A and B. A serves by tossing a coin. If the outcome is heads (H) the service is good; if tails (T) there is a fault and that player is allowed to serve again. Only two services are allowed. H or TH gives a good service; TT gives a double fault, and B wins the point.

If the service is good, B rolls the die.

If the outcome is 1, 2, 3, or 4 then it is a good stroke; if 5 or 6 then the point is lost.

If the stroke is good then A rolls the die. This continues until the point is lost.

**Pete is playing Mark in a game of Rainy Day Tennis.**

a) Pete is serving. He tosses the coin and gets a head. He then tosses the coin again and gets another head. Mark says that Pete is playing the game incorrectly. Explain why.

b) The following results of tossing the coin and rolling the die were recorded for a game:

T H 3 1 4 2 6

Explain who won, given that Pete served. Explain your answer

c) If neither player had a coin, but they had the die, explain a method that could be used to play the game so that it is basically the same as in the rules.

d) State one factor that may cause this simulation to no longer model the real world event.

**Question 14 (4 marks – 1, 1, 1, 1)**

1. What is the difference between a census and a sample?
2. Give one reason why the Australian census is conducted.

The 2016 census data estimated Australia’s population at 23 401 892.

The median age of people in Australia is 38 years.

Use the data below from the 2016 Census to complete this sentence.

1. Children aged 0 - 14 years made up \_\_\_\_\_\_\_\_\_\_\_\_\_ % of the population and people aged
2. 65 years and over made up \_\_\_\_\_\_\_\_\_\_\_\_ % of the population in 2016.

|  |  |  |
| --- | --- | --- |
| **Age** | **2016** | **2011** |
| 0 - 4 years | 1 464 779 | 1 421 050 |
| 5 - 9 years | 1 502 646 | 1 351 921 |
| 10 -14 years | 1 397 183 | 1 371 054 |
| 15 - 19 years | 1 421 595 | 1 405 798 |
| 20 - 24 years | 1 566 793 | 1 460 674 |
| 25 - 29 years | 1 664 602 | 1 513 236 |
| 30 - 34 years | 1 703 847 | 1 453 775 |
| 35 - 39 years | 1 561 679 | 1 520 138 |
| 40 – 44 years | 1 583 257 | 1 542 879 |
| 45 – 49 years | 1 581 455 | 1 504 143 |
| 50 – 54 years | 1 523 551 | 1 447 404 |
| 55 – 59 years | 1 454 332 | 1 297 244 |
| 60 – 64 years | 1 299 397 | 1 206 116 |
| 65 – 69 years | 1 188 999 | 919 319 |
| 70 – 74 years | 887 716 | 708 090 |
| 75 – 79 years | 652 658 | 545 263 |
| 80 – 84 years | 460 549 | 436 937 |
| 85 years and over | 486 842 | 402 681 |

End of Test