**MATHEMATICS APPLICATIONS**

**MAWA Semester 2 (Units 3 & 4)**

**Examination 2017**

**Calculator-free**

# Marking Key

**Section One: Calculator-free (50 Marks)**

**Question 1 (a)**

|  |
| --- |
| Solution*T*2 *=* 2*, T3=* 0.5 x 2 – 8 = -7 |
| Marking key/mathematical behaviours | Marks |
| * identifies second term
* determines an expression for the third term
* calculates third term
 | 111 |

**Question 1 (b)**

|  |
| --- |
| Solution*Tn= -4n + 9, n=50* |
| Marking key/mathematical behaviours | Marks |
| * deduces and expression for the nth term
* determines -4 *n* = -200
* determines *n* = 50
 | 111 |

**Question 2 (a)**

|  |
| --- |
| SolutionEach edge represents a connection between stations |
| Marking key/mathematical behaviours | Marks |
| * identifies representation of an edge
 | 1 |

**Question 2 (b)**

|  |
| --- |
| SolutionCMEKPNRZWHT or CHTRZWEMNPK |
| Marking key/mathematical behaviours | Marks |
| Identifies a route which* starts at C and ends at a different node
* travels through each node once only
* has no repeated edges
 | 111 |

**Question 2 (c)**

|  |
| --- |
| SolutionThe graph can be drawn in 2 dimensions without any edges crossing |
| Marking key/mathematical behaviours | Marks |
| * describes planarity
 | 1 |

**Question 2 (d)**

|  |
| --- |
| Solution*v* = 11, *f* = 11, *e*= 20.*v* + *f* - *e* = 2 |
| Marking key/mathematical behaviours | Marks |
| * determines values for the numbers of faces, edges and vertices
* expresses the relationship between *e*, *f* and *v*
 | 11 |

**Question 2 (e)**

|  |
| --- |
| Solution(i) Louise would need to come back through R or H to reach T and Z and one of the conditions is to visit each station only once.(ii) NEM, NEW  |
| Marking key/mathematical behaviours | Marks |
| * describes inability to meet a necessary condition
* identifies alternate incorrect starting route
 | 11 |

**Question 3 (a)**

|  |
| --- |
| Solution |
| Marking key/mathematical behaviours | Marks |
| * 10 edges correctly weighted
* 15 edges correctly weighted
* 10 edges correctly positioned
* 15 edges correctly positioned
 | 1111 |

**Question 3 (b)**

|  |
| --- |
| SolutionMaximum number of hours is 16V1 comes on WednesdayV2 comes on TuesdayV3 comes on ThursdayV4 comes on Monday |
| Marking key/mathematical behaviours | Marks |
| * subtracts every number from the maximum number
* reduces two rows
* reduces further two rows
* identifies maximum number of hours
* describes allocation of volunteers
 | 11111 |

**Question 4 (a)**

|  |
| --- |
| SolutionB. The weekly allowance is $1100 whereas it is $1000 in both A and C. |
| Marking key/mathematical behaviours | Marks |
| * identifies correct rule
* explains choice of rule
 | 11 |

**Question 4 (b)**

|  |
| --- |
| SolutionC. 1.10 as the ratio represents 110% so a 10% increase each year.  |
| Marking key/mathematical behaviours | Marks |
| * identifies correct rule
* explains choice of rule
 | 11 |

**Question 4 (c)**

|  |
| --- |
| Solution Amount = 1.05 x 500 000 – 1000 x 52= 500 000 + 25000 – 52000= $473 000 |
| Marking key/mathematical behaviours | Marks |
| * determines 5% of 500 000
* calculates value after one year
 | 11 |

**Question 4 (d)**

|  |
| --- |
| SolutionRule CThe payout is the same each year as A but the rate of growth is higher than in A.In B the growth is 8% per year which is lower than in C and the payout is higher by $100.This mean the investment is growing at a slower rate and reducing by more money each year.  |
| Marking key/mathematical behaviours | Marks |
| * compares the influence of the rates for A, B, C
* identifies the significance of the different amounts transferred
* concludes that C is the best option
 | 111 |

**Question 5 (a)**

|  |
| --- |
| SolutionAB |
| Marking key/mathematical behaviours | Marks |
| * plots and labels A
* plots and labels B
 | 11 |

**Question 5 (b)**

|  |
| --- |
| SolutionNumber of attempts |
| Marking key/mathematical behaviours | Marks |
| * identifies explanatory variable
 | 1 |

**Question 5 (c)(i)(ii)**

|  |
| --- |
| Solution(i) You cannot get a success of 2.3 with 0 attempts because there are no successes possible OR a success cannot be fractional.(ii) 5. The rate is 0.5 successes per attempt and 0.5 of 10 is 5 |
| Marking key/mathematical behaviours | Marks |
| * interprets the vertical intercept
* determines change in the number of successes
* interprets the gradient
 | 111 |

**Question 5 (d)**

|  |
| --- |
| SolutionABOVEFor the same number of attempts their number of successes is greater so they would be above the same number of attempts as a less successful player |
| Marking key/mathematical behaviours | Marks |
| * interprets scatter plot
* explains positioning on scatter plot
 | 11 |

**Question 5 (e)**

|  |
| --- |
| SolutionINCREASEThere is less variation as only the least successful players are left |
| Marking key/mathematical behaviours | Marks |
| * concludes a lower correlation coefficient
* explains the lower correlation coefficient
 | 11 |

**Question 5 (f)**

|  |
| --- |
| SolutionC |
| Marking key/mathematical behaviours | Marks |
| * identifies most likely residual plot
 | 1 |

**Question 6 (a)**

|  |
| --- |
| Solution24 km |
| Marking key/mathematical behaviours | Marks |
| * identifies 8 correct roads and not incorrect roads
* identifies a further 2 correct roads without any incorrect roads
* determines length of cycle paths
 | 111 |

**Question 6 (b)**

|  |
| --- |
| Solution PB, BR, BF, RF, FB, FN, BC |
| Marking key/mathematical behaviours | Marks |
| * identifies all roads not required
 | 1 |

**Question 6 (c)**

|  |
| --- |
| SolutionCycle paths are now 33 kmMC and FR are now needed |
| Marking key/mathematical behaviours | Marks |
| * identifies change in length
* identifies change of edges
 | 11 |