**MATHEMATICS APPLICATIONS**

**MAWA Semester 1 (Unit 3) Examination 2017**

**Calculator-free**

# Marking Key

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The release date for this exam and marking scheme is

* **the end of week 8 of term 2, 2017**

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

**Question 1**

|  |
| --- |
| Solution Direction is positive – the dots rise as the number of boats nominated increase.Association is linear, the dots form a pattern around a straight lineStrength is very good – nearly in a straight line |
| Marking key/mathematical behaviours | Marks |
| * describes direction and justifies
* describes form and justifies
* describes strength and justifies
 | 222 |

**Question 2 (a)**

|  |
| --- |
| Solution 2, 5, 12.5 |
| Marking key/mathematical behaviours | Marks |
| * identifies second term
* identifies third term
 | 11 |

**Question 2 (b)**

|  |
| --- |
| Solution30, 10, $3\frac{1}{3}$ |
| Marking key/mathematical behaviours | Marks |
| * identifies first term, second term and identifies third term
 | 3 |

**Question 2 (c)**

|  |
| --- |
| Solution |
| Marking key/mathematical behaviours | Marks |
| * identifies first term
* expresses recursive rule using recursive notation
 | 11 |

**Question 2 (d)**

|  |
| --- |
| Solution |
| Marking key/mathematical behaviours | Marks |
| * uses notation for the general rule with initial term
* identifies ratio with power
 | 11 |

**Question 3 (a)**

|  |
| --- |
| Solution 4  |
| Marking key/mathematical behaviours | Marks |
| * identifies degree of nominated vertex
 | 1 |

**Question 3 (b)**

|  |
| --- |
| SolutionRB forms a bridge because the graph would not be connected if RB was removed. |
| Marking key/mathematical behaviours | Marks |
| * identifies RB as a bridge
* explains connectedness of graph changing without the bridge
 | 11 |

**Question 3 (c)**

|  |
| --- |
| Solution BRHTSWMRS |
| Marking key/mathematical behaviours | Marks |
| * identifies a trail
 | 1 |

**Question 3 (d)**

|  |
| --- |
| Solution  |
| Marking key/mathematical behaviours | Marks |
| * redraws graph in planar form
 | 1 |

**Question 3 (e)**

|  |
| --- |
| SolutionV + f – e = 7 + 3 – 8 = 2 |
| Marking key/mathematical behaviours | Marks |
| * substitutes into Euler’s rule
* uses values for v, f, e to match graph
 | 11 |

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**Question 3 (f)**

|  |
| --- |
| SolutionYes: Nodes can be divided into two groups (RWT and BMSH) and within each group there is no connection and all edges are from a node in one group to a node in another group. |
| Marking key/mathematical behaviours | Marks |
| * identifies there are 2 groups of nodes hence bipartite
* explains why nodes can be formed into groups
 | 11 |

**Question 4 (a)**

|  |
| --- |
| SolutionNumber of internet users per 100 people in the country |
| Marking key/mathematical behaviours | Marks |
| * Identifies the response variable
 | 1 |

**Question 4 (b)**

|  |
| --- |
| Solution0.4 x 200 + 3 = 83  |
| Marking key/mathematical behaviours | Marks |
| * Determines value of the subject of the formula
 | 1 |

**Question 4 (c)**

|  |
| --- |
| Solution Not very reliable. Prediction is extrapolated beyond the data given.At the high end the dots are not very close to the line. (correlation coefficient is less than 0.6) |
| Marking key/mathematical behaviours | Marks |
| * concludes prediction is not reliable
* gives 2 reasons to justify the lack of reliability
 | 1 2 |

**Question 4 (d)**

|  |
| --- |
| SolutionWith no mobile phones in the population there are still 3 people per 100 using the internet.  |
| Marking key/mathematical behaviours | Marks |
| * interprets the vertical intercept
 | 1 |

**Question 4 (e)**

|  |
| --- |
| SolutionPositive gradient or rate of change - For every extra mobile phone there is 0.4 extra internet users. (10 for 4) |
| Marking key/mathematical behaviours | Marks |
| * notes a positive trend
* details the rate of change
 | 11 |

**Question 4 (f)**

|  |
| --- |
| SolutionThere were about 50 less than expected |
| Marking key/mathematical behaviours | Marks |
| * circles point to match description
* estimates difference using line
 | 11 |

**Question 5 (a)**

|  |
| --- |
| Solution |
| Marking key/mathematical behaviours | Marks |
| * determines directed edges for Jon
* determines directed edges for Kay
* determines directed edges for Min
* determines directed edges for Nat
 | 1111 |

**Question 5 (b)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solution

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| J | K | L | M | N |

|  |
| --- |
| J |
| K |
|  L |
| M |
| N |

  |
| Marking key/mathematical behaviours | Marks |
| * labels rows and columns
* 0 along the leading diagonal
* 5 x 5 with only 0 or 1
* 1 for wins
* 0 for loss or not player
 | 11111 |

**Question 6 (a)**

|  |
| --- |
| SolutionDoes the use of mobile phones include texting?IS the time spent parked at the lights included in the driving? |
| Marking key/mathematical behaviours | Marks |
| * Devises a question to clarify the task
 | 1 |

**Question 6 (b)**

|  |
| --- |
| SolutionNumber of calls made your mobile while driving yesterdayNumber of texts sent from your mobile while driving last Saturday |
| Marking key/mathematical behaviours | Marks |
| * identifies two numeric variables relevant to the investigation
 | 2 |

**Question 6 (c)**

|  |
| --- |
| Solution Observation – watch people driving and see if they are using their phonesSurvey – ask driversAsk police for the data |
| Marking key/mathematical behaviours | Marks |
| * identifies 2 ways by which data can be collected.
 | 2 |

**Question 6 (d)**

|  |
| --- |
| SolutionIt is not texting that causes the accident but the loss of concentration on the task in handIt is due to confounding – the other variable (concentration) is affected by the texting |
| Marking key/mathematical behaviours | Marks |
| * identifies confounding
* concludes it is not a causal relationship
 | 11 |