**MATHEMATICS METHODS**

**MAWA Semester 1 (Unit 1) Examination 2015**

**Calculator-free**

# Marking Key

**Section One: Calculator-free (60 Marks)**

**Question 1(a)**

|  |  |
| --- | --- |
| Solution |  |
| Marking key/mathematical behaviours | Marks |
| * Determines | 1 |

**Question 1(b)**

|  |  |
| --- | --- |
| Solution    by using the right triangle identity or  by knowledge of exact values  Similarly | |
| Marking key/mathematical behaviours | Marks |
| * indicates use of or uses meaningfully * states correct exact value of  (accept ) * indicates use of * states correct exact value of  (accept ) | 1  1  1  1 |

**Question 1(c)**

|  |  |
| --- | --- |
| Solution    From exact values and use of unit circle, | |
| Marking key/mathematical behaviours | Marks |
| * indicates method of determination on diagram * states both correct values of | 1  1 |

**Question 2(a)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * multiplies the equation by the LCD * expands brackets and simplifies * solves for x | 1  1  1 |

**Question 2(b)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * factorises trinomial * solves for x | 1  1 |

**Question 2(c)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * completes the square * equates * takes square root * solves for x | 1  1  1  1 |

**Question 3**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * sketches  accurately, showing x and y intercepts * sketches reflecting the correct turning point, orientation and intercepts * sketches  with correct radius and centre | 1+1  1+1+1  2 |

**Question 4**

|  |  |
| --- | --- |
| Solution  Graph A:  Graph B: | |
| Marking key/mathematical behaviours | Marks |
| * Graph A   + correct horizontal translation   + recognition of reflection in * Graph C   + correct horizontal translation   + correct dilation factor   + recognition of reflection in | 1  1  1  1  1 |
|  |  |

**Question 5(a)**

|  |  |
| --- | --- |
| Solution    2. From part (i), *P*(*X*) = 0.7 and *P(Y*)= 0.5   *P(X)*  *P(Y)* = 0.35  0.3 | |
| Marking key/mathematical behaviours | Marks |
| (i)   * determines * determines correct value for   (ii)   * determines * shows that * concludes that the two events are not independent | 1  1  1  1  1 |

**Question 5(b)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| (i)   * applies the conditional probability formula * substitutes correctly * multiplies correctly and simplifies * determines correct value for   (ii)   * determines * applies complimentary property and arrives at the correct result | 1  1  1  1  1  1 |

**Question 6(a)**

|  |  |
| --- | --- |
| Solution  Has the form  Period =  hence  =  Vertical translation 1 unit up, hence  = 1.  Dilation parallel to *y* axis, scale factor = 3. Hence, *a* = 3 | |
| Marking key/mathematical behaviours | Marks |
| * determines the period and hence * identifies vertical translation and determines  = 1 * determines * states the correct equation | 1  1  1  1 |

**Question 6(b)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * graph is drawn over the correct domain * graph is a cosine curve with the correct amplitude * graph has the correct period * phase shift is correct * graph is accurate passing through (0,-3) and has smooth turning points | 1  1  1  1  1 |

**Question 7 (a)**

|  |  |
| --- | --- |
| Solution | |
| Marking key/mathematical behaviours | Marks |
| * uses the correct binomial coefficients * each term has the correct powers for * uses  correctly in each term | 1  1  1 |

**Question 7(b)**

|  |  |
| --- | --- |
| Solution  The mouse has six choices to enter and five choices to leave by another door.  So, | |
| Marking key/mathematical behaviours | Marks |
| * states the correct result | 1 |

**Question 7(c)**

|  |
| --- |
| Solution    2. There is only one card with an even number on it.(2)   There are six other numbers that the 2 can be combined with to give an even product.     1. For the product to be prime, one of the cards must be ONE(1)   Any of the other six cards can be combined with 1 to give a prime product     1. There are only 4 possible combinations of two of the numbers that sum to a prime number. 1+2, 2+3, 2+5, 2+11. |

|  |  |
| --- | --- |
| Marking key/mathematical behaviours | Marks |
| (i)   * states correct sample space   (ii)   * determines that there are 6 pairs of numbers (listing or logic) that have an even product and determines the correct probability of an even product   (iii)   * indicates that the only way that the product can be prime is if one of the cards has a one on it. * determines the correct probability of a prime product   (iv)   * provides some form of exhaustive listing of the sum of two numbers * determines that there are only 4 possibilities of prime sums * determines the correct probability of the sum being prime | 1  1+1  1  1  1  1  1 |