**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 B   + 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  Therefore not equal | |
| Marking key/mathematical behaviours | Marks |
| (i)   * determines * determines correct value for   (ii)   * determines * shows that | 1  1  1  **2** |

**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)**

** one mark denominator one mark numerator of answer**

**Question 7(b)**

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**one mark for two products, one mark denominator one mark numerator of answer**

**Question 7(c)**

****

**one mark for two products, one mark denominator one mark numerator for answer**

**Question 7(d)**

****

**2 marks for denominator, one mark for numerator, one mark for final answer**

|  |  |
| --- | --- |
| 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 |