| **Question** | **Scheme** | | **Marks** |
| --- | --- | --- | --- |
| **1** |  | Awrt 114 | B1 |
|  | Uses their α to find *x*.  Allow | M1 |
|  |  | A1 |
|  | (can be implied by 246.4...) | M1 |
| *x* = 85.5 |  | A1 |
|  | (Can be implied by 473.57...) | M1 |
| *x* = 161.2 |  | A1 |
|  |  | | (7 marks) |
| **2(a)** | Way 1 | Way 2 |  |
|  | gives so | B1 |
| E.g. or  or | so | M1 |
| So  or  so  or \* | \* | A1cso\* |
|  |  | | **(3)** |
| **2(b)** | Way 1: | Way 2: Expands  and uses quadratic formula on 3TQ | M1 |
| or awrt 0.8047 **and** awrt0.1381 | | A1 |
| *x* = 53.58 , 126.42 (or 126.41), 352.06, 187.94 | | dM1A1 A1 |
|  |  | | **(5)** |
|  |  | | **(8 marks)** |
| **3(a)** | States or uses | | M1 |
|  | | A1 |
|  |  | | **(2)** |
| **3(b)** | sin 2*x* = 0 gives 2*x* = 0, 180, 360 so *x* = 0, 90, 180 | B1 for two correct answers, second B1 for all three correct. Excess in range – lose last B1 | B1B1 |
| gives 2*x =* 78.46 (or 78.5 or 78.4) **or** 2*x* = 281.54 (or 281.6) | | M1 |
| *x* = 39.2 (or 39.3), 140.8(or 141) | | A1A1 |
|  |  | | **(5)** |
|  |  | | **(7 marks)** |
| **4(a)** | 3sin2 *x* + 7sin *x* = cos2 *x* – 4; 0 ≤ *x* < 360° | |  |
| 3sin2 *x* + 7sin *x* = (1 – sin2 *x*) – 4 | | M1 |
| 4sin2 *x* + 7sin *x* + 3 = 0 **AG** | | A1\* cso |
|  |  | | **(2)** |
| **4(b)** | (4sin *x* + 3)(sin *x* + 1) {= 0}  sin *x*  = , sin *x*  = – 1  (|*α*| = 48.59…)  *x* = 180 + 48.59 or *x* = 360 – 48.59  *x* = 228.59… or *x* = 311.41…  {sin *x*  = – 1}  *x* = 270 | |  |
| Valid attempt at factorization and sin *x*  = … | | M1 |
| Both sin *x*  =  and sin *x*  = – 1 | | A1 |
| Either (180 + |*α*|) or (180 – |*α*|) | | dM1 |
| Both awrt 228.6 and awrt *x* = 311.4 | | A1 |
| 270 | | B1 |
|  |  | | **(5)** |
|  |  | | **(7 marks)** |
| **5(a)** | (i) ;  (ii) ; | |  |
|  | | M1 |
| So, | | M1 |
| and | | A1 A1 |
| **Both answers are cso and must come from correct work** | |  |
|  |  | | **(4)** |
| **5(b)** |  | | M1 |
|  | |  |
|  | |  |
|  | | A1 |
|  | | A1A1ft |
|  | | B1 |
|  |  | | **(5)** |
|  |  | | **(9 marks)** |
| **6(i)** |  | |  |
|  | | B1 |
| or | | M1 |
|  | | A1 |
|  |  | | **(3)** |
| **6(ii)(a)** |  | | M1 |
|  | | dM1 |
| \* | | A1 cso \* |
|  |  | | **(3)** |
| **6(ii)(b)** | **or** | | M1 |
| , | | A1A1 |
|  | | M1A1 |
|  |  | | **(5)** |
|  |  | | **(11 marks)** |

|  |  |  |  |  |  |
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|  | **Source paper** | **Question number** | **New spec references** | **Question description** | **New AOs** |
| 1 | C2 Jan 2013 | 4 | 5.7 | Trigonometry | 1.1b, 2.1, 2.4, 2.5 |
| 2 | C2 2017 | 8 | 5.3 and 5.5 | Solving trig equations | 1.2, 2.1, 2.4; 1.1b |
| 3 | C2 2012 | 6 | 5.5 and 5.7 | Trigonometry | 1.1b, 2.1 and 2.4 |
| 4 | C2 Jan 2011 | 7 | 5.5 and 5.7 | Trigonometry | 1.1a, 1.1b, 2.4, 2.5 |
| 5 | C2 2014 | 7 | 5.5 and 5.7 | Trigonometric equations | 1.1b, 2.1, 2.4, 2.5 |
| 6 | C2 2013 | 8 | 5.5 and 5.7 | Trigonometric equations | 1.1b, 2.4 and 2.5 |