| **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 |