| **Question** | **Scheme** | | | **Marks** |
| --- | --- | --- | --- | --- |
| **1** |  | | Writing this is sufficient for M1 | M1 |
|  | | For  This mark can be implied | A1 |
|  | |  | B1 B1 |
|  | |  | A1 **cso** |
|  |  | | | **(5 marks)** |
| **2(a)** | = | | | M1 |
|  | | | A1 |
|  |  | | | **(2)** |
| **2(b)** | **=** | | | M1 |
|  | | | dM1 |
| or *b* = 3, *c* = 6 | | | A1 |
|  |  | | | **(3)** |
|  |  | | | **(5 marks)** |
| **3(a)** |  | | | B1 |
|  |  | | | **(1)** |
| **3(b)** | For  or  or or 0.25 as coefficient of , for any value of *k* including *k* = 0 | | | M1 |
| Correct index for *x* so *A*or o.e. for any value of *A* | | | B1 |
| =  or 0.25 | | | A1 cao |
|  |  | | | **(3)** |
|  |  | | | **(4 marks)** |
| **4(a)** |  | | | M1 |
| =729 | | | A1 |
|  |  | | | **(2)** |
| **4(b)** | or equivalent | | | M1 |
|  | | | A1 |
|  |  | | | **(2)** |
|  |  | | | **(4 marks)** |
| **5(a)** | = 2 or  or better | | | M1 |
| or 0.5 (ignore ±) | | | A1 |
|  |  | | | **(2)** |
| **5(b)** | =  or  or equivalent | | | M1 |
| or 16 | | | A1 cao |
|  |  | | | **(2)** |
|  |  | | | **(4 marks)** |
| **6(a)** |  | | | M1 |
|  | | | A1 |
|  |  | | | **(2)** |
| **6(b)** |  | | | M1 |
|  | | | A1 |
|  |  | | | **(2)** |
|  |  | | | **(4 marks)** |
| **7(a)** |  | | | M1 |
|  | | | A1 cao |
|  |  | | | **(2)** |
| **7(b)** |  | | | M1 |
| or | | | dM1A1 |
|  |  | | | **(3)** |
| **8** | with *a* = 6 **or** *b* = 9 | | | M1 |
| as **final** answer with no errors or  or 3(2*x* + 3) | | | A1 |
|  |  | | | **(2 marks)** |
| **9** | = for example | | | M1 |
| =  or *y* = 6*x* + 2 or *a* = 6, *b* = 2 | | | A1 |
|  |  | | | **(2 marks)** |
| **10(a)** |  | | | M1A1 |
|  |  | | | **(2)** |
| **10(b)** | (0, 19)  (4, 3) | | | B1  B1  B1 |
|  |  | | | **(3)** |
| **10(c)** |  | | | M1 |
|  | | | A1 |
|  | | | A1 |
|  |  | | | **(3)** |
|  |  | | | **(8 marks)** |
| **11(a)** | Discriminant: or equivalent | | | M1A1 |
|  |  | | | **(2)** |
| **11(b)** |  | | | M1A1 |
|  |  | | | **(2)** |
| **11(c)** | For real roots,  or  or | | | M1 |
| for all *k*, so **,** so roots are real for all *k* (or equiv.) | | | A1 cso |
|  | | | **(2)** |
|  |  | | | **(6 marks)** |
| **12(a)** | *p*, *q* are integers. | | |  |
|  | | | M1 |
|  | | | A1A1 |
|  |  | | | **(3)** |
| **12(b)** |  | | | M1 |
|  | | | A1 |
|  |  | | | **(2)** |
| **12(c)** |  | Correct  shape | | M1 |
| Maximum **within** the 4th quadrant | | A1 |
| Curve cuts through –5 or marked on the *y*-axis | | B1 |
|  |  | | | **(3)** |
|  |  | | | **(8 marks)** |
| **13(a)** | Allow or “*y* squared”  not required | | | B1 |
|  |  | | | **(1)** |
| **13(b)** | or | | | M1 |
|  | | | A1 |
|  | | | M1A1 |
|  |  | | | **(4)** |
|  |  | | | **(5 marks)** |
| **14** |  | | | B1 |
| Accept  or  or  or even or equivalent | | |  |
| quadratic (or initial cubic) into two brackets | | | M1 |
|  | | | A1 |
|  |  | | | **(3 marks)** |
| **15** |  | | | B1 |
| =(5+3*x*)(5-3*x*) | | | M1 |
|  | | | A1 |
|  |  | | | **(3 marks)** |
| **16(a)** |  | | | M1 |
| = 0 so (*x*+2) is a factor | | | A1 |
|  |  | | | **(2)** |
| **16(b)** |  | | | M1A1 |
|  | | | dM1A1 |
|  |  | | | **(4)** |
|  |  | | | **(6 marks)** |
| **17(a)** |  | | |  |
|  | | | M1 |
| and so is a factor. | | | A1 |
|  |  | | | **(2)** |
| **17(b)** |  | | | M1A1 |
| or equivalent e.g. | | | **d**M1A1 |
|  |  | | | **(4)** |
|  |  | | | **(6 marks)** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Source paper** | **Question number** | **New spec references** | **Question description** | **New AOs** |
| 1 | C1 2012 | 3 | 2.2 | Indices and surds | 1.1b, 2.1 and 2.4 |
| 2 | C1 2016 | 3 | 2.2 | Manipulation of surds | 1.1b |
| 3 | C1 2014 | 2 | 2.1 | Laws of indices for rational exponents | 1.1b |
| 4 | C1 June 2014R | 2 | 2.1 | Laws of indices | 1.1b |
| 5 | C1 Jan 2011 | 1 | 2.1 | Indices and surds | 1.1b |
| 6 | C1 2012 | 2 | 2.1 | Indices and surds | 1.1b |
| 7 | C1 2013 | 3 | 2.1 | Laws of Indices for all rational components | 1.1b, 3.1a |
| 8 | C1 Jan 2013 | 2 | 2.1 | Indices and surds | 1.1b |
| 9 | C1 2016 | 2 | 2.1 | Laws of indices for rational exponents | 1.1b |
| 10 | C1 2017 | 5 | 2.3 | Completing the square, graph | 1.1b |
| 11 | C1 2011 | 7 | 2.3 | Quadratics | 1.1b, 2.4 |
| 12 | C1 2012 | 8 | 2.3 | Quadratics | 1.1b |
| 13 | C1 2015 | 7 | 2.1 and 2.3 | Laws of indices, solution of quadratic equations | 1.1b |
| 14 | C1 Jan 2013 | 1 | 2.6 | Polynomials, Factor theorem | 1.1b |
| 15 | C1 June 2014R | 1 | 2.6 | Cubic factorisation | 1.1b |
| 16 | C2 2012 | 4 | 2.6 | Polynomials, Factor theorem | 1.1b, 2.2 |
| 17 | C2 2014 | 2 | 2.6 | Polynomials, factor theorem | 1.1b |