**QQQ – C2 Chapter 3 – Logarithms**

(Recommended Time: 23 minutes)

1. Give the value of (1)
2. Give the value of (1)
3. Find the value of such that (2)
4. Solve , giving your answer to 3sf. (2)
5. Draw a sketch of , ensuring you indicate where the graph intercepts the axes.  
    (2)
6. Find the values of *x* such that

2 log3 *x* – log3(*x* – 2) = 2

(5)

1. Solve the equation

72*x* − 4(7*x*) + 3 = 0,

giving your answers to 2 decimal places where appropriate.

(6)

*(13+ Bronze, 15+ Silver, 17+ Gold, 19 Platinum)*

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**QQQ – C2 Chapter 3 – Logarithms – RETAKE**

(Recommended Time: 22 minutes)

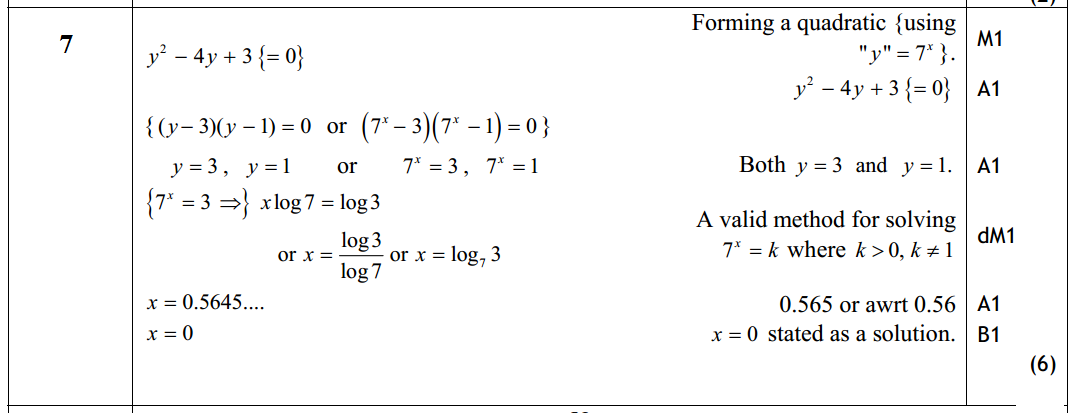
1. (i) Write down the value of (1)  
   (ii) Express as a single logarithm to base . (3)
2. Given that 0 < x < 4 and   
   find the value of x. (6)
3. (a) Find, to 3 significant figures, the value of x for which 5x = 7. (2)  
   (b) Solve the equation (4)
4. Find such that (2)

*(13+ Bronze, 14+ Silver, 16+ Gold, 18 Platinum)*

**QQQ – C2 Chapter 3 – Logarithms - ANSWERS:**

1. or (1 mark)
2. (1 mark)
3. M1 for . A1 for (2 marks in total)
4. M1 for or . A1 for (2 marks in total)
5. 1 mark for two of the following criteria, 2 marks for all of the following criteria:  
   (1) correct shape below x-axis.  
   (2) correct shape above x-axis.  
   (3) x-intercept of 1 indicated.

|  |  |  |
| --- | --- | --- |
| 6 |  | B1 |
|  |  | M1 |
|  |  | A1 o.e. |
|  | Solves  to give | M1 |
|  | , *x* = 6 | A1 |
|  |  | Total 5 |

**OUT OF 19 MARKS**

**QQQ – C2 Chapter 3 – Logarithms - RETAKE ANSWERS:**

|  |  |  |
| --- | --- | --- |
| Q1. (i) | 2 | B1 (1) |
| (ii) | (or ) | B1 |
|  | (Allow e.g. ) | M1, A1 (3) |
|  |  | **Total 4 marks** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q2** | | , | B1, M1 | |
|  | | **or  o.e.** | M1 A1 | |
|  | | (*x* = −1) | dM1 A1  (6)  **[6]** | |
| Notes | | **B1** is awarded for  anywhere.  **M1** for correct use of log *A* – log *B* = log | | |
|  | | **M1** for replacing 1 by  . **A1** for correct quadratic | | |
|  | | ( is **B1M0M1A0 M0A0**) | | |
|  | | **dM1** for attempt to solve quadratic with usual conventions. (Only award if previous two **M** marks have been awarded) | | |
|  | | **A1** for 4/5 or 0.8 or equivalent (Ignore extra answer). | | |
| Alternative 1 | | so | M1  M1 | |
|  | | then could complete solution with | B1 | |
|  | |  | A1 | |
|  | | Then as in first method(*x* = −1) | dM1 A1  (6)  **[6]** | |
| Special cases | | Complete trial and error yielding 0.8 is **M3** and **B1** for 0.8  **A1, A1** awarded for each of two tries evaluated. i.e. 6/6  Incomplete trial and error with wrong or no solution is 0/6  Just answer 0.8 with no working is **B1** | | |
| If log base 10 or base e used throughout - can score **B1M1M1A0M1A0** | | |
| **3.** (*a*) | |  | | | M1 | |
|  | | 1.21 | | | A1 (2) | |
| (*b*) | |  | | | M1 A1 | |
|  | | *x* = 1.2 (awrt) | | | A1 ft | |
|  | | *x* = 1 | | | B1 (4) | |
|  | |  | | | **(6 marks)** | |

1. M1 for . A1 for (both must be given). (2 marks in total)

**OUT OF 18 MARKS**