## MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

### Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

### Abbreviations

awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
nfww not from wrong working
oe or equivalent
rot rounded or truncated
SC Special Case
soi seen or implied

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(a) |  | **3** | **B1** for correct shape with max and min in the correct quadrant. Ignore labelling of their maximum point if incorrect coordinates.<br><br>**B1** for $-5,\ -2,\ \frac{1}{2}$ marked on $x$-axis. Must have a cubic shape<br><br>**B1** for 2 marked on the $y$-axis. Must have a cubic shape |
| 1(b) | $x \leqslant -5,\quad -2 \leqslant x \leqslant \frac{1}{2}$ | **2** | **B1** for each<br>If **B0** then **SC1** for $x < -5,\quad -2 < x < \frac{1}{2}$ |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a) | $q(x) = 3x^2 - 10x - 8$<br>$r = 5$ | **3** | **M1** for a valid attempt to obtain the quotient by algebraic long division, synthetic division, factorising $(2x - 5)$ or by forming an identity<br><br>**A1** for each |
| 2(b) | $[p(x) - 5 =](3x^2 - 10x - 8)(2x - 5)$ | **M1** | For a correct attempt to factorise |
| | $(3x + 2)(x - 4)(2x - 5)$ | **A1** | Must see $p(x) - 5$ as a product of linear factors |
| 2(c) | $x = -\frac{2}{3},\ 4,\ \frac{5}{2}$ | **B1** | **FT** on *their* 3 terms quadratic $q(x)$ |
| 3(a) | $1 = \lg 10$ soi | **B1** | |
| | $\lg \frac{10(x^2 - 1)}{(x - 1)^2}$ oe | **M1** | For correct use of logs power rule **or** multiplication **or** division rule. i.e.:<br>Award **M1** for example:<br>$2\log(x-1) = \log(x-1)^2$<br>$\log(x^2 - 1) = \log(x-1) + \log(x+1)$<br>$\log 10 + \log(x^2 - 1) = \log 10(x^2 - 1)$<br>$\log(x^2 - 1) - \log(x-1)^2 = \log \frac{(x^2 - 1)}{(x-1)^2}$ |
| | $\lg \frac{10(x - 1)(x + 1)}{(x - 1)^2}$ | **DM1** | **Dep** on previous **M1**<br>for a correct attempt to factorise and an attempt to simplify |
| | $\lg \frac{10(x + 1)}{x - 1}$ | **A1** | |
| 3(b) | $[4\log_5(x + 1) =] \frac{9}{\log_5(x + 1)}$ or<br>$\frac{4}{\log_{(x+1)} 5} [= 9\log_{(x+1)} 5]$ | **B1** | For change of base |
| | $(\log_5(x + 1))^2 = \frac{9}{4}$ or $(\log_{(x+1)} 5)^2 = \frac{4}{9}$ | **2** | **M1** for a correct method in forming a quadratic equation<br>Dep on previous **B1** |
| | $x + 1 = 5^{(\pm)\frac{3}{2}}$ | **M1** | **Dep** on dealing with logarithms correctly<br>Allow if ± is missing |
| | $x = -1 + 5\sqrt{5},\quad -1 + \frac{1}{25}\sqrt{5}$ | **A1** | |

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