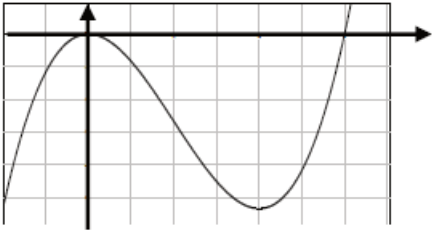
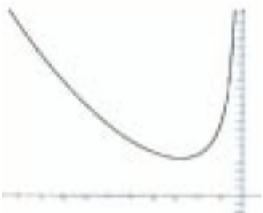


| Question | Answer | Marks | AO Element | Notes | Guidance |
|----------|--|-------|------------|--|----------|
| 1(a) | -1.25, 1.25 oe | 2 | | B1 for each | |
| 1(b) | Correct curve | 4 | | B3FT for 9 or 10 correctly plotted points or B2FT for 7 or 8 correctly plotted points or B1FT for 5 or 6 correctly plotted points | |
| 2 | Correct sketch with maximum at origin and minimum in fourth quadrant  | 2 | | B1 for any cubic with exactly 2 distinct turning points | |
| 3(a) | (3, 1) | 1 | | | |
| 3(b) | Q plotted at $(-4, 2)$ | 1 | | | |
| 3(c) | R plotted at $(1, 2)$ | 1 | | | |

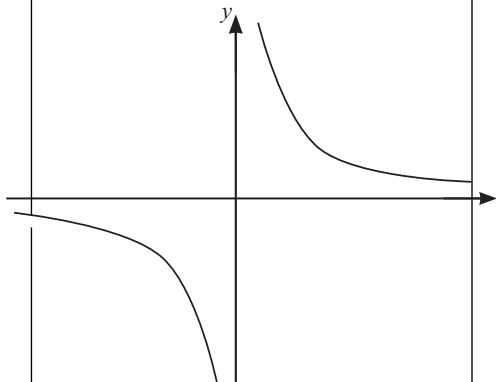
| Question | Answer | Marks | AO Element | Notes | Guidance |
|----------|--|----------|------------|--|----------|
| 3(d) | Line $y = 3$ drawn | 1 | | | |
| 4(a) | $-2 \dots -4 \dots -12 \quad 12 \dots 4 \dots 2$ | 3 | | B2 for 4 or 5 correct B1 for 2 or 3 correct | |
| 4(b) | Correct curve | 4 | | B3FT for 9 or 10 points plotted correctly B2FT for 7 or 8 points plotted correctly B1FT for 5 or 6 points plotted correctly | |
| 4(c) | Correct ruled line drawn | 1 | | | |
| 4(d) | 2.4 | 1 | | FT <i>their</i> graph and $y = 5$ | |
| 5(a) | $1.5 \quad 4 \quad -4 \quad -1.2$ | 3 | | B2 for 3 correct or B1 for 1 or 2 correct | |
| 5(b) | Correct graph drawn | 4 | | B3FT for 12 or 11 correct plots B2FT for 10 or 9 correct plots B1FT for 8, 7 or 6 correct plots | |
| 5(c) | 2 | 1 | | | |

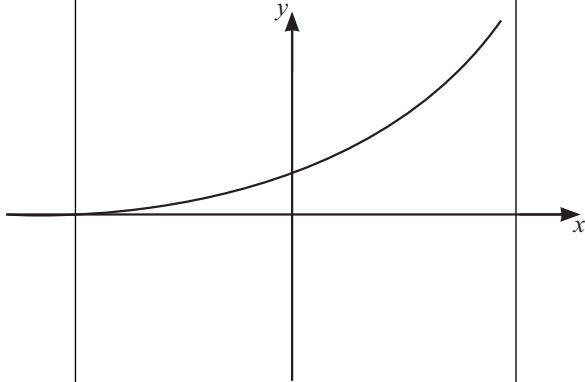
| Question | Answer | Marks | AO Element | Notes | Guidance |
|-----------|----------------------------------|-------|------------|---|----------|
| 5(d) | $y = x$ oe $y = -x$ oe | 2 | | B1 for each | |
| 5(e) | Correct ruled line | 1 | | | |
| 5(f) | -2.4 | 1 | | FT <i>their</i> graph and $y = 2.5$ | |
| 6(a) | -1 -3 -7.5 7.5 3 1.5 1 | 3 | | B2 for 5 or 6 correct B1 for 3 or 4 correct | |
| 6(b) | Correct curve | 4 | | B3FT for 11 or 12 points correctly plotted B2FT for 9 or 10 points correctly plotted B1FT for 6, 7 or 8 points correctly plotted | |
| 6(c) | 2 | 1 | | | |
| 6(d)(i) | Lines $y = x$ and $y = -x$ drawn | 2 | | B1 for each | |
| 6(d)(ii) | $y = -x$ oe | 1 | | | |
| 6(d)(iii) | -2.5 | 1 | | FT <i>their</i> intersection of $y = -6$ with <i>their</i> graph | |
| 7(a) | -3 | 1 | | | |

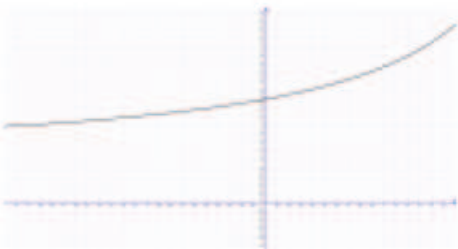
| Question | Answer | Marks | AO Element | Notes | Guidance |
|----------|--|-------|------------|--|----------|
| 7(b) | -1 1.55 to 1.6 4.4 to 4.45 | 3 | | B1 for each | |
| 7(c) | -8 | 1 | | | |
| 7(d) | Ruled line through origin intersecting curve once | 2 | | B1 for ruled line through origin | |
| 8(a) | -25 0 155 | 3 | | B1 for each | |
| 8(b) | Completely correct curve | 4 | | B3FT for 7 or 8 correctly plotted points B2FT for 5 or 6 correctly plotted points B1FT for 3 or 4 correctly plotted points | |
| 8(c)(i) | $x = -3$ oe | 1 | | | |
| 8(c)(ii) | $(-3, k)$ oe where $-180 \leq k < -165$ | 1 | | FT <i>their</i> graph | |
| 8(d) | 10 -16 | 2 | | B1 FT for each | |
| 9(a) | 1[.0] 0.9 | 2 | | B1 for each | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|-----------|--|-------|------------|--|----------|
| 9(b) | correct curve  | 4 | | B3 FT for 6 or 7 points B2 FT for 4 or 5 points B1 FT for 2 or 3 points | |
| 9(c) | B1 for ruled line at $y = -1$ B1 for 0.3 to 0.32 | 2 | | | |
| 10(a) | 2 | 1 | | | |
| 10(b)(i) | e.g. $4 = \frac{k}{2}$ leading to $k = 8$ | 1 | | accept use of any correct coordinates | |
| 10(b)(ii) | 0.032 oe | 1 | | | |
| 10(c)(i) | -1, -2, -4, -8 | 2 | | B1 for 2 correct | |
| 10(c)(ii) | Correct curve | 3 | | B2FT for 3 or 4 correct plots B1FT for 1 or 2 correct plots | |
| 10(d) | $y = x$ oe $y = -x$ oe | 2 | | B1 for each | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|-----------|--|-------|------------|--|----------|
| 11(a) | -2.25 -4.5 -9 9 4.5 2.25 | 3 | | B2 for 4 or 5 correct or B1 for 2 or 3 correct | |
| 11(b) | Correct curve | 4 | | B3FT for 9 or 10 points correctly plotted or B2FT for 7 or 8 points correctly plotted or B1FT for 5 or 6 points correctly plotted | |
| 11(c) | 2 | 1 | | | |
| 11(d)(i) | (-8, -3) and (6, 4) plotted and joined in a ruled line | 2 | | B1 for one point correctly plotted or both correctly plotted but not joined, or ruled | |
| 11(d)(ii) | -7.3 to -6.9 and 4.9 to 5.3 | 2 | | B1FT for each | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|------------|--|-------|------------|---|----------|
| 11(d)(iii) | $[y =] \frac{1}{2}x + 1$ oe final answer | 2 | | <p>B1 for $\frac{1}{2}x + c$ ($c \neq +1$) or $kx + 1$ ($k \neq 0$ or $\frac{1}{2}$)</p> <p>or B1FT for <i>(their m)x + c</i></p> <p>or $kx + \text{their intercept}$ ($k \neq 0$)</p> | |
| 12(a) | <p>Correct sketch</p>  | 2 | | <p>B1 for one correct branch or attempt at correct shape</p> | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|-----------|---|-------|------------|--|----------|
| 12(b) | Correct sketch  | 2 | | B1 for correct shape but crossing x -axis or correct shape but just in one quadrant | |
| 13(a) | -6 2 14 14 2 -6 | 3 | | B2 for 4 or 5 correct B1 for 2 or 3 correct | |
| 13(b) | Completely correct curve | 4 | | B3FT for 9 or 10 correctly plotted points B2FT for 7 or 8 correctly plotted points B1FT for 5 or 6 correctly plotted points | |
| 13(c)(i) | $x = -0.5$ oe | 1 | | | |
| 13(c)(ii) | $(-0.5, k)$ oe where $14 < k \leq 14.8$ | 1 | | | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|------------|---|-------|------------|--|----------|
| 13(d) | 3.3 to 3.7, -4.7 to -4.3 | 2 | | B1FT for each | |
| 14(a)(i) | $[a =] 4$ $[b =] -3$ nfw | 2 | | B1 for $[a =] 4$ B1 for $[b =] -3$ nfw | |
| 14(a)(ii) | $y = 4$ oe | 1 | | | |
| 14(a)(iii) | $y = -6x + 7$ oe final answer | 2 | | B1 for answer $-6x + 7$ or answers $y = -6x + c$ or $y = kx + 7$ ($k < 0$) | |
| 14(b)(i) | 2.25 2.67 3.5 | 3 | | B1 for each | |
| 14(b)(ii) | correct curve  | 4 | | B3 FT for 7 or 8 points or B2 FT for 5 or 6 points or B1 FT for 3 or 4 points | |
| 14(c)(i) | -0.78 to -0.72 and 0.55 to 0.59 | 2 | | B1 for each | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|--------------|---|-------|------------|--|----------|
| 14(c)(ii) | $3x^3 - 9x^2 - 3x + 4 [= 0]$ final answer | 4 | | <p>B3FT for 3 out of 4 correct terms or for $bx^3 - 3bx^2 + (a - 1)x + 8 - 3a [= 0]$ oe</p> <p>or B2FT for 2 out of 4 correct terms or for 3 out of 4 terms from $bx^3 - 3bx^2 + (a - 1)x + 8 - 3a [= 0]$</p> <p>or M1 for $1 + \frac{5}{3 - x} = \text{their } 4 + (\text{their } (-3))x^2$ oe</p> | |
| [Total: 128] | | | | | |