



Q	Answer	Marks
1	positive cubic through $(-2, 0)$, $(1, 0)$, $(4, 0)$ and $(0, 8)$	3
2	negative cubic touching the x-axis at $(0, 0)$ and crossing at $(3, 0)$	3
3	asymptotes $x = 2$ and $y = 3$; crosses at $(0, 5/2)$ and $(5/3, 0)$	4
4	positive quartic touching at $(0, 0)$, crossing at $(-3, 0)$ and $(2, 0)$	3
5	a) $(5, 8)$ b) $(3, 11)$ c) $(1, 8)$ d) $(3, -8)$, a minimum e) $(2, 12)$	5
6	a) $(-5, 0)$, $(-1, 0)$ and $(0, 5)$ b) $(-3, 0)$, $(1, 0)$ and $(0, 6)$ c) $(3, 0)$, $(-1, 0)$ and $(0, 3)$	7
7	$y = 2(x + 1)^2(x - 3)$	3
8	a) $(x - 3)^2 + 4$ b) translation by 3 units in the positive x direction and 4 units in the positive y direction c) $k = 4$ d) $y = 2x^2 - 12x + 26$	6
9	a) positive cubic through $(-3, 0)$, $(-1, 0)$, $(2, 0)$ and $(0, -6)$ b) $k = 2, -1, -3$ c) $(-3/2, 0)$, $(-1/2, 0)$, $(1, 0)$	6
10	a) $x(x - 2)(x + 2)$ b) C crosses at $(-2, 0)$, $(0, 0)$, $(2, 0)$; l through the origin with gradient 5 c) $(-3, -15)$, $(0, 0)$, $(3, 15)$	7
11	a) asymptotes $x = 0$, $y = -1$; crosses at $(-2, 0)$ and $(2, 0)$ b) $a = 1$ or $a = -3$ c) $x = -1$ or $x = 3$	7
12	a) shown b) touches at $(2, 0)$, crosses at $(-1, 0)$ and $(0, 4)$ c) $(0, 4)$ and $(2, 0)$ d) $0 < k < 4$	9

Full worked solutions, written out by hand, are on the solutions sheet for this topic.