Question Number	Scheme	Marks
6. (a)	$(540°, -5)$	B1, B1 **(2)**
(b) (i)	$(360°, 3)$	B1, B1 **(2)**
(ii)	$(180°, 5)$	B1, B1 **(2)** **(6 marks)**

Notes applying to all parts:

Note 1

Score B1 for one correct coordinate, so B0 B1 is NOT possible

So for example (a) $(720°, -5)$ scores B1 B0

Note 2

Coordinates can be given separately

E.g. (a) $x = 540°$, $y = -5$

Note 3

Coordinates may appear within the question. Solutions to (b)(i) for example may well contain two sets of coordinates. E.g. $(360°, 5)$ followed by $(360°, 3)$. This will most likely be their working so in almost all cases you will mark their final set of coordinates

Note 4

Score B1 B0 for a **correct** solution but with the coordinates "flipped".

E.g. (b) (i) $(3, 360°)$ instead of $(360°, 3)$

Note 5

Condone omission of degrees

Note 6

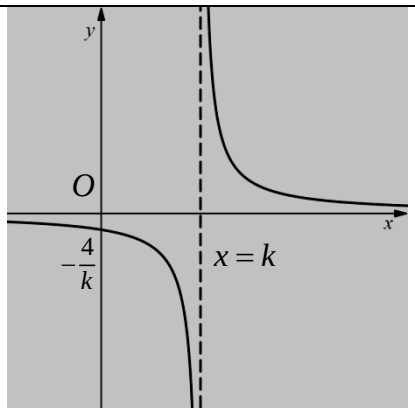
If solutions are given in radians then withhold a mark the first time it happens

E.g. (a) $(3\pi, -5)$ (b)(i) $(2\pi, 3)$ (b)(ii) $(\pi, 5)$ scores (a) B1 B0 (b)(i) B1 B1 (b)(ii) B1 B1

Note 7

If solutions are not in brackets (and not stated as $x =$ $y =$) then withhold a mark the first time it happens

E.g. (a) $540°, -5$ (b)(i) $360°, 3$ (b)(ii) $180°, 5$ scores (a) B1 B0 (b)(i) B1 B1 (b)(ii) B1 B1

Question Number	Scheme	Marks
7. (a)		
	Shape in quadrant One	M1
	Fully correct shape and position	A1
	C cuts the y-axis at $-\frac{4}{k}$	B1
	C has a vertical asymptote at $x=k$	B1 **(4)**
(b)	$\frac{4}{x-k}=9-x \Rightarrow x^2-(9+k)x+9k+4=0$	M1, A1
	Uses $b^2-4ac<0 \Rightarrow (9+k)^2-4\times1\times(9k+4)<0$	dM1
	$k^2-18k+65<0 \Rightarrow (k-13)(k-5)<0 \Rightarrow 5<k<13$	ddM1, A1 **(5)** **(9 marks)**

(a) Marks for intercept and asymptote must be shown on the graph and hence cannot be scored without a sketch

M1: For a monotonically decreasing function in quadrant one. It must not cross either axis but be tolerant of functions that (a) don't go down as far as the x-axis and (b) extend as far left as the y -axis

A1: Correct shape and position (for whole curve). Be tolerant of slips of the pen but the intension should be clear. Look for the curve in quadrants 1, 3 and 4 with a vertical asymptote in quadrant 1 and 4. The left-hand branch should not intentionally dip below the intercept away from the x -axis

B1: C cuts the y-axis once at $-\frac{4}{k}$ which must be on the negative y-axis as $-\frac{4}{k}$, $\left(0,-\frac{4}{k}\right)$ but not $\left(-\frac{4}{k},0\right)$

B1: C must have one vertical asymptote to the right of the y-axis marked $x=k$

(b)

M1: Equates curve with given line and attempts to form a quadratic. The terms do not need to be collected

Look for $\frac{4}{x-k}=9-x$ (condoning slips), cross multiplies and proceeds to a quadratic expression

A1: Achieves a simplified quadratic with collected terms. Look for $x^2-(9+k)x+9k+4=0$ o.e. or else gives the correct values of a, b and c which may be implied by values embedded within b^2-4ac.

dM1: Attempts to use the discriminant $b^2-4ac...0$ for their $ax^2+bx+c=0$ with both b and c expressions in k

ddM1: Solves their quadratic in k resulting from $b^2-4ac=0$ and chooses the inside region for their critical values. Allow calculator solutions here so you may need to check if the method is not apparent. Condone the boundaries being included in the inequality for this mark.
It is dependent upon both previous M's

A1: CSO $5<k<13$ o.e. The variable must be k.

Accept alternatives such as $k>5$ and $k<13$ $k>5, k<13$ $(5,13)$ or $k\in(5,13)$

BUT NOT $k>5$ or $k<13$