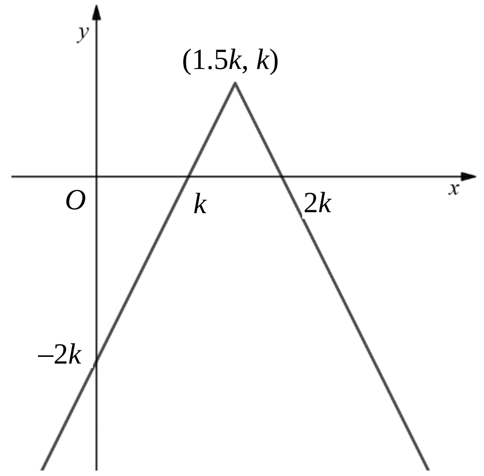
Question	Scheme	Marks	AOs
11(a)			
	$\wedge$ shape in any position	B1	1.1b
	Correct x-intercepts or coordinates	B1	1.1b
	Correct y-intercept or coordinates	B1	1.1b
	Correct coordinates for the vertex of a $\wedge$ shape	B1	1.1b
		(4)	
(b)	$x = k$	B1	2.2a
	$k-(2x-3k)=x-k \Rightarrow x=...$	M1	3.1a
	$x=\dfrac{5k}{3}$	A1	1.1b
	Set notation is required here for this mark $\left\{x : x<\dfrac{5k}{3}\right\} \cap \{x : x>k\}$	A1	2.5
		(4)	
(c)	$x = 3k$ **or** $y = 3 - 5k$	B1ft	2.2a
	$x = 3k$ **and** $y = 3 - 5k$	B1ft	2.2a
		(2)	
			(10 marks)

Notes

(a) **Note that the sketch may be seen on Figure 4**

B1: See scheme

B1: Correct x-intercepts. Allow as shown or written as $(k, 0)$ and $(2k, 0)$ and condone coordinates written as $(0, k)$ and $(0, 2k)$ as long as they are in the correct places.

B1: Correct y-intercept. Allow as shown or written as $(0, -2k)$ or $(-2k, 0)$ as long as it is in the correct place. Condone $k - 3k$ for $-2k$.

B1: Correct coordinates as shown

Note that the marks for the intercepts and the maximum can be seen away from the sketch but the coordinates must be the right way round or e.g. as $y = 0$, $x = k$ etc. These marks can be awarded without a sketch but if there is a sketch, such points must not contradict the sketch.

(b)

B1: Deduces the correct critical value of $x = k$. May be implied by e.g. $x > k$ or $x < k$

M1: Attempts to solve $k - (2x - 3k) = x - k$ or an equivalent equation/inequality to find the other critical value. Allow this mark for reaching $k = \ldots$ or $x = \ldots$ as long as they are solving the required equation.

A1: Correct value

A1: Correct answer using the correct set notation.

Allow e.g. $\left\{x : x \in \mathbb{R}, k < x < \frac{5k}{3}\right\}$, $\left\{x :\ k < x < \frac{5k}{3}\right\}$, $x \in \left(k, \frac{5k}{3}\right)$ and allow "|" for " :"

But $\left\{x : x < \frac{5k}{3}\right\} \cup \{x : x > k\}$ scores A0 $\left\{x :\ k < x,\ x < \frac{5k}{3}\right\}$ scores A0

(c)

B1ft: Deduces one correct coordinate. Follow through their maximum coordinates from (a) so allow $x = 2\times$"1.5k" or $y = 3 - 5\times$"k" but must be in terms of k.

Allow as coordinates or $x = ..$, $y = \ldots$

B1ft: Deduces both correct coordinates. Follow through their maximum coordinates from (a) so allow $x = 2\times$"1.5k" and $y = 3 - 5\times$"k" but must be in terms of k.

Allow as coordinates or $x = ..$, $y = \ldots$

If coordinates are given the wrong way round and not seen correctly as $x = \ldots$, $y = \ldots$

e.g. $(3 - 5k, 3k)$ this is B0B0

Alternative to part (b) by squaring:

$$k - |2x - 3k| = x - k \Rightarrow |2x - 3k| = 2k - x$$

$$4x^2 - 12kx + 9k^2 = 4k^2 - 4kx + x^2 \Rightarrow 3x^2 - 8kx + 5k^2 = 0$$

$$(3x - 5k)(x - k) = 0 \Rightarrow x = \frac{5k}{3},\ k$$

Score M1 for isolating the $|2x - 3k|$, squaring both sides to obtain 3 appropriate terms for each side, collects terms to obtain $Ax^2 + Bkx + Ck^2 = 0$ and solves for x

A1 for $x = \frac{5k}{3}$ and B1 for $x = k$

Then A1 as in the scheme.