Question	Scheme	Marks	AOs
5	Let x_P be the positive solution and x_N be the negative solution of $\mathrm{f}(x)=0$ **Note:** $y=\mathrm{f}(x)$ is symmetrical about the line $x=\frac{5}{3}$		
(a)	$\mathrm{f}(x) = 7-\lvert 3x-5\rvert = 0 \Rightarrow \lvert 3x-5\rvert = 7$ at least one of either…	M1	2.1
	• $3x-5=7 \Rightarrow x_P = 4$ • $3x-5=-7 \Rightarrow x_N = -\frac{2}{3}$	A1	1.1b
	Area $(R) = \frac{1}{2}\left(4 - -\frac{2}{3}\right)(7)$ **or** $2\left(\frac{1}{2}\left(4-\frac{5}{3}\right)(7)\right)$ **or** $2\left(\frac{1}{2}\left(\frac{5}{3} - -\frac{2}{3}\right)(7)\right)$	M1	3.1a
	$= \frac{49}{3}$ or $16\frac{1}{3}$ (units)^2	A1	1.1b
		(4)	
(b)	$7-\lvert 3x-5\rvert = k$, k is a constant, has two distinct real solutions		
	Deduces that $k<7$	B1	2.2a
		(1)	
		(5 marks)	

Question 5 Notes:

(a)

M1: Complete process of using the modulus function $y=\mathrm{f}(x)$ to find at least one of the x coordinates where $y=\mathrm{f}(x)$ cuts through the x-axis.

A1: At least one of either $x=4$ or $x=-\frac{2}{3}$

M1: Finds at least one value where $y=\mathrm{f}(x)$ cuts through the x-axis together with a complete process to find the Area (R); e.g.

- $\frac{1}{2}(\text{their } x_P - \text{their } x_N)(7)$
- $2\left(\frac{1}{2}\left(\text{their } x_P - \frac{5}{3}\right)(7)\right)$, where their $x_P > \frac{5}{3}$
- $2\left(\frac{1}{2}\left(\frac{5}{3} - \text{their } x_N\right)(7)\right)$, where their $x_N < 0$

A1: See scheme

(b)

B1: Uses Figure 3 and the equation $y=\mathrm{f}(x)$ to deduce the correct answer. E.g.

- $k<7$
- $\{k : k<7\}$