Question Number	Scheme	Marks
5(a)	States or implies that $\log_{10} p = 0.32$ **or** $\log_{10} q = \frac{0.56-0.32}{8}$	M1
	p = awrt 2.089 **or** q = awrt 1.072	A1
	States or implies that $\log_{10} p = 0.32$ **and** $\log_{10} q = \frac{0.56-0.32}{8}$	M1
	p = awrt 2.089 **and** q = awrt 1.072	A1
		(4)
(b)	States or implies that $\frac{\mathrm{d}A}{\mathrm{d}t} = p \ln q \times q^t$ with their values for p and q	M1 A1
	Rate of increase in pond weed after 6 days is 0.22 (m^2/day)	A1
		(3)
		(7 marks)

(a)

M1: States or implies that $\log_{10} p = 0.32$ **or** $\log_{10} q = \frac{0.56-0.32}{8}$ or equivalent equations

A1: p = awrt 2.089 **or** q = awrt 1.072

M1: States or implies that $\log_{10} p = 0.32$ **and** $\log_{10} q = \frac{0.56-0.32}{8}$ or equivalent equations

A1: p = awrt 2.089 **and** q = awrt 1.072

(b)

M1: Uses $\frac{\mathrm{d}}{\mathrm{d}t} q^t \to kq^t \quad k \neq 1$

A1: States or implies that $\frac{\mathrm{d}A}{\mathrm{d}t} = p \ln q \times q^t$ with their values for p and q

A1: awrt 0.22 Units are not required

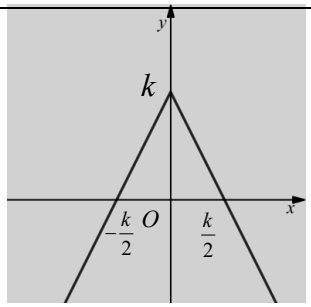
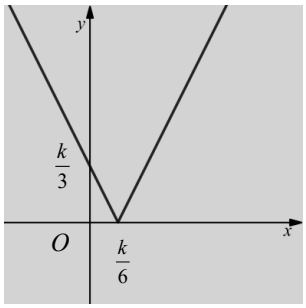
.....

Alt (b) using $\log_{10} A = 0.03t + 0.32$ as a starting point

M1: Attempts to differentiate and reaches $\frac{1}{A}\frac{\mathrm{d}A}{\mathrm{d}t} = k$ or equivalent

A1: $\frac{1}{A \ln 10}\frac{\mathrm{d}A}{\mathrm{d}t} = 0.03$

A1: awrt 0.22 Units are not required

Question Number	Scheme		Marks
6(a)(i)		Shape	M1
		Correct intercepts.	A1
(ii)		Shape	M1
		Correct intercepts.	A1
			(4)
(b)	Attempts to solve either $k+2x=-2x+\frac{k}{3}$ **or** $k-2x=2x-\frac{k}{3}$		M1
	Achieves either $x=-\frac{1}{6}k$ **or** $x=\frac{1}{3}k$ oe		A1
	Attempts to solve both $k+2x=-2x+\frac{k}{3}$ **and** $k-2x=2x-\frac{k}{3}$		M1
	Achieves either $x=-\frac{1}{6}k$ **and** $x=\frac{1}{3}k$		A1
			(4)
			(8 marks)

(a)

M1: For the shape of $y=k-2\left|x\right|$. Score for an upside down V with maximum on the *y*-axis with the branches at least reaching the *x*-axis.

A1: Intercepts at k on the *y*-axis and $\pm\frac{k}{2}$ on the *x*-axis. Allow as values or coordinates and allow coordinates the wrong way round (e.g. (*k*, 0) for (0, *k*)) as long as they are in the correct places. The graph must cross the axes at these points.

M1: For the shape of $y=\left|2x-\frac{k}{3}\right|$. Score for a V shape in quadrants 1 and 2 with a minimum on the *x*-axis and at least reaches the *y*-axis.

A1: Intercepts at $\frac{k}{3}$ on the *y*-axis and $\frac{k}{6}$ on the *x*-axis. Allow as values or coordinates and allow coordinates the wrong way round (e.g. (*k*/3, 0) for (0, *k*/3)) as long as they are in the correct places. The graph must cross the *y*-axis and touch the *x*-axis.

(b)

M1: Attempts to solve one correct equation not involving moduli (or equivalent equations)

A1: One correct solution. Allow unsimplified forms such as $-\frac{2k}{12}$