Question Number	Scheme	Marks
8 (a)	States $y=4$	B1 (1)
(b)	States $(16,9)$ only	B1 (1)
(c)	$k \leqslant 4, k=9$	B1, B1 (2)
(d) (i)	$a=6$	B1
(ii)	$y=\mathrm{f}(x-3)$	B1 (2)
		(6 marks)

(a)

B1 $y=4$ only. May be written on a new graph

(b)

B1 $(16,9)$ condone lack of brackets and must be the only answer (or clearly their final answer). May be written on a graph again.

(c)

B1 Sight of either one of $k \leqslant 4, k=9$ Must be in terms of *k.* Ignore any others for this mark

B1 Both of $k \leqslant 4, k=9$ ONLY Where several inequalities or equations are given only mark what appears to be their final answer for the $k=...$ and their final answer for $k \leqslant ...$ Ignore any inequalities which are within $k \leqslant 4$

SC $y \leqslant 4, y=9$ (They never write in terms of k so score B1B0)

(d)(i)

B1 $a=6$ (6 on its own is sufficient). Also allow $(\mathrm{y}=)\ \mathrm{f}(x)-6$ and isw if they proceed to state $a=-6$

B1 $y=\mathrm{f}(x-3)$ Also accept $y=-\mathrm{f}(x)+6,\quad y=\mathrm{f}(x+4)-9$ or even rearrangements such as $\mathrm{f}(x)=6-y$ Do not accept combinations of different transformations as the question asked for a single transformation.

Question Number	Scheme	Marks
9.	$\frac{3}{x}+5=-2x+c$	
	Multiplies through by x $\quad 3+5x=-2x^2+cx \Rightarrow \pm 2x^2 .....(=0)$	M1
	and writes in quadratic form $\quad \Rightarrow 2x^2+(5-c)x+3(=0)$ oe	A1
	Attempts $"b^2-4ac"=(5-c)^2-24$	M1
	Attempts $"b^2-4ac"=0 \Rightarrow (5-c)^2-24=0 \Rightarrow c=...$	dM1
	$(c=)\ 5\pm 2\sqrt{6}$ oe	A1
	Attempt at inside region	M1
	$5-2\sqrt{6}<c<5+2\sqrt{6}$ oe	A1
		(7) (7 marks)

M1 Attempts to multiply through by x and moves all terms to one side. This may be implied by later work. Condone one term not being multiplied by x for this mark but all four terms must be on one side. You do not have to see the "=0".

A1 Correct quadratic with the terms in x factorised, or correct values of a, b and c. Accept the equivalent form where terms have been collected on the other side. The "=0" is not needed for this mark and ignore the use of any inequalities.

M1 Attempts b^2-4ac using their values. You may see $"b^2...4ac"$. It is sufficient to see the values substituted in correctly for this mark and you can condone invisible brackets. They must have achieved a quadratic in x to calculate the discriminant so do not allow if eg a is their coefficient of x^{-1} but do allow this mark if they have a quadratic from incorrect working.

dM1 Attempts to solve their $b^2-4ac=0$ to find at least one of the critical values for c. Must have achieved a quadratic in c. Apply general marking principles for solving a quadratic. This is dependent on the previous method mark and may be implied by solutions correct to 1dp for their quadratic.

A1 Correct critical values $(c=)\ 5\pm\sqrt{24}$ or exact equivalent of the form $\frac{a\pm\sqrt{b}}{c}$ (the critical values may appear within inequalities)

M1 Finds inside region for their critical values. They may draw a diagram but they must proceed to an $...<c<...$ (allow use of $\leq$ for one or both inequalities for this mark and they may even be separate statements) May be in terms of x or any other variable for this mark.