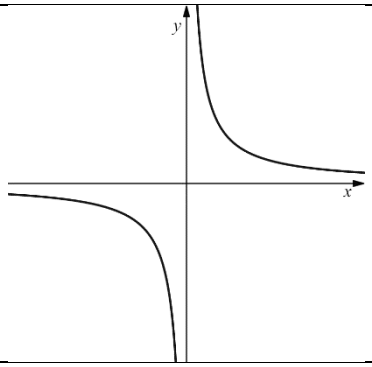
Question Number	Scheme		Marks
7(a)		Correct Shape in quadrant 1 or 3	M1
		Fully correct shape and position	A1
			(2)
(b)	E.g. Translate 2 (units) to the right (parallel to the *x*-axis)		B1, B1
			(2)
(c)	When $x=-4 \Rightarrow \frac{6}{x-2}=kx+7 \Rightarrow \frac{6}{-6}=-4k+7 \Rightarrow k=...$		M1
	$k=2$		A1
			(2)
(d)	$\frac{6}{x-2}="2"x+7 \Rightarrow 6=2x^2+3x-14$		M1
	$0=2x^2+3x-20 \Rightarrow (2x-5)(x+4)=0$		dM1
	$Q=\left(\frac{5}{2},12\right)$		A1, A1
			(4)
			(10 marks)

(a)

M1: For a monotonically decreasing function in quadrant 1 or 3 with no incorrect asymptotes in that quadrant.

It must not cross either axis but be tolerant of functions that don't go up or down as far as the *x*-axis and as far left or right as the *y*-axis.

The "ends" should not come back away from the axes significantly but be tolerant of "wobbles".

A1: Correct shape and position with no incorrect asymptotes.

Remember to check both diagrams and score the best single attempt if both are used.

(b)

B1: Partial description that implies at least one of the two components but is not fully correct

E.g. "Translates 2 units left", "Shifts/moves 2 units right"

B1: Requires (1): Translate/translation **and** (2): $\begin{pmatrix}2\\0\end{pmatrix}$ or "2 (units to the) right" or e.g. "+2 in the *x* direction"

A minimum could be e.g.: "Translate +2 on *x*"

(c)

M1: Substitutes $x = \pm 4$ into $\frac{6}{x-2} = kx + 7$ and solves for k.

Allow equivalent work e.g. $x = -4 \Rightarrow y = -1 \Rightarrow -1 = k(-4) + 7 \Rightarrow k = ...$

Note that some will rearrange before substitution which is fine.

E.g. $\frac{6}{x-2} = kx + 7 \Rightarrow 6 = (x-2)(kx+7) = kx^2 + (7-2k)x - 14,\ 6 = 24k - 42 \Rightarrow k = ...$

A1: $k = 2$ oe e.g. $k = \frac{4}{2}$

(d)

M1: Equates $\frac{6}{x-2}$ with $kx + 7$ using their **value** for k, cross multiplies to obtain a quadratic equation in x with terms not necessarily collected. Note that the rearrangement may have already been done in part (c).

dM1: Solves 3TQ by any acceptable method including via a calculator.

A1: $x = \frac{5}{2}$. Condone $Q = \frac{5}{2}$

A1: $Q = \left(\frac{5}{2}, 12\right)$. Must be as coordinates or $x = \ldots$, $y = \ldots$

Question Number	Scheme	Marks
8(a)	$y = 3x + "c"$ or $y = "m"x - 12'$	M1
	$y = 3x - 12$	A1
		(2)
(b)	$k = 10$	B1
		(1)
(c)	E.g. $y = A(x-4)(x-10)$ or $y = C(x-7)^2 - 18$	M1
	E.g. $-18 = A(7-4)(7-10) \Rightarrow A = ...$ Or $0 = C(4-7)^2 - 18 \Rightarrow C = ...$	dM1
	$y = 2(x-4)(x-10)$, $y = 2(x-7)^2 - 18$ o.e.	A1
		(3)
(d)	Two of $y > 3x - 12$, $y < 2(x-4)(x-10)$, $x > 0$, $x < 4$	M1
	E.g. $3x - 12 < y < 2(x-4)(x-10)$, $0 < x < 4$	A1
		(2)
		(8 marks)

(a)

M1: Attempts form $y = mx + c$ with m or c correct. May be implied by e.g. $m = 3$ (or $\frac{12}{4}$) or $c = -12$

A1: $y = 3x - 12$. A full correct equation is required including "$y =$". Condone $\frac{12}{4}$ for 3.

(b)

B1: $k = 10$. Condone $x = 10$ and condone (10, 0)

(c)

M1: Attempts an equation of the form $(y =) A(x-4)(x-"10")$ or $(y =) C(x-7)^2 - 18$

Condone with A, $C = 1$ or any other constant.

It is possible they could try with an attempt to use all three coordinates.

The "y =" is not needed unless the equation is attempted as e.g. $y + 18 = C(x-7)^2$

dM1: Full attempt at equation with an attempt at finding A or C. **Depends on the first mark.**

E.g. $y = A(x-4)(x-"10")$ and uses $x = 7$, $y = -18$ to find A or $y = C(x-7)^2 - 18$ and uses $x = 4$ or $x =$ "10" when $y = 0$ to find C

A1: $(y =) 2(x-4)(x-10)$, $(y =) 2(x-7)^2 - 18$ o.e. e.g. $(y =) 2(x-7)^2 - 18$

The "$y =$" is **not** required here, just look for a correct expression.

(d)

M1: Two of $y > 3x - 12$, $y < 2(x-4)(x-10)$, $x > 0$, $x < 4$ Accept with $\leqslant \leftrightarrow <$ and $\geqslant \leftrightarrow >$

Follow through their answers to part (a) and part (c) provided (a) is linear and (c) is quadratic.

Do not allow e.g. $R > 3x - 12$, $R < 2(x-4)(x-10)$ etc. but allow f(x) for y.