Q1.

1	*EITHER:*	State or imply non-modular inequality $(x - 4)^2 > (x + 1)^2$, or corresponding equation	B1
		Expand and solve a linear inequality, or equivalent	M1
		Obtain critical value 1½	A1
		State correct answer $x < 1½$ (allow ≤)	A1
	OR:	State a correct linear equation for the critical value e.g. $4 - x = x + 1$	B1
		Solve the linear equation for x	M1
		Obtain critical value 1½, or equivalent	A1
		State correct answer $x < 1½$	A1
	OR:	State the critical value 1½, or equivalent, from a graphical method or by inspection or by solving a linear inequality	B3
		State correct answer $x < 1½$	B1
			[4]

Q2.

1	EITHER	State or imply non-modular inequality $x^2 > (3x - 2)^2$, or corresponding equation	M1	
		Expand and make reasonable solution attempt at 2- or 3-term quadratic, or equivalent	M1	
		Obtain critical values ½ and 1	A1	
		State correct answer $½ < x < 1$	A1	
	OR	State one correct linear equation for a critical value	M1	
		State two equations separately	A1	
		Obtain critical values ½ and 1	A1	
		State correct answer $½ < x < 1$	A1	
	OR	State one critical value from a graphical method or inspection or by solving a linear inequality	B1	
		State the other critical value correctly	B2	
		State correct answer $½ < x < 1$	B1	**4**

Q3.

1	*EITHER:*	State or imply non-modular inequality $(2x-7)^2 = 3^2$, or corresponding equation	M1	
		Obtain critical values 2 and 5	A1	
		State correct answer $x < 2$, $x > 5$	A1	
	OR:	State one critical value, e.g. $x = 5$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B1	
		State correct answer $x < 2$, $x > 5$	B1	**3**

Q4.

1	**EITHER**	State or imply non-modular inequality $(x-3)^2 > (x+2)^2$, or corresponding equation	M1	
		Expand and solve a linear inequality, or equivalent	M1	
		Obtain critical value $\frac{1}{2}$	A1	
		State correct answer $x < \frac{1}{2}$ (allow $x \leqslant \frac{1}{2}$)	A1	
	OR	State a correct linear equation for the critical value, e.g. $3 - x = x + 2$, or corresponding correct inequality, e.g. $-(x-3) > (x+2)$	M1	
		Solve the linear equation, or inequality	M1	
		Obtain critical value $\frac{1}{2}$	A1	
		State correct answer $x < \frac{1}{2}$	A1	
	OR	Make recognisable sketches of both $y = \lvert x-3 \rvert$ and $y = \lvert x+2 \rvert$ on a single diagram	B1	
		Obtain a critical value from the intersection of the graphs	M1	
		Obtain critical value $\frac{1}{2}$	A1	
		State final answer $x < \frac{1}{2}$	A1	[4]

Q5.

1	**EITHER**	State or imply non-modular inequality $(3x-1)^2 < 2^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical values $-\frac{1}{3}$ and 1	A1	
		State correct answer $-\frac{1}{3} < x < 1$	A1	
	OR	State one critical value, e.g. $x = 1$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B1	
		State correct answer $-\frac{1}{3} < x < 1$	B1	[3]

Q6.

2	*EITHER:*	State or imply non-modular inequality $(3x+2)^2 < x^2$, or corresponding quadratic equation, or pair of linear equations $3x + 2 = \pm x$	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = -1$ and $x = -\frac{1}{2}$	A1	
		State answer $-1 < x < -\frac{1}{2}$	A1	
	OR:	Obtain the critical value $x = -1$ from a graphical method or by inspection, or by solving a linear equation or inequality	B1	
		Obtain the critical value $x = -\frac{1}{2}$ similarly	B2	
		State answer $-1 < x < -\frac{1}{2}$	B1	[4]

Q7.

1	**EITHER:**	State or imply non-modular inequality $(2x-3)^2 > 5^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical values -1 and 4	A1	
		State correct answer $x < -1, x > 4$	A1	
	OR:	State one critical value, e.g. $x = 4$, having solved a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B1	
		State correct answer $x < -1, x > 4$	B1	[3]

Q8.

3	**EITHER**	State or imply non-modular inequality $(2x-1)^2 < (x+4)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values -1 and 5	A1	
		State correct answer $-1 < x < 5$	A1	[4]
	OR	Obtain one critical value, e.g. $x = 5$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		Obtain the other critical value similarly	B2	
		State correct answer $-1 < x < 5$	B1	

Q9.

1	*EITHER*	Attempt to square both sides obtaining three terms on each side	M1	
		Attempt solution of three-term quadratic equation	M1	
		Obtain $5x + 4x - 9 = 0$ and hence $-\frac{9}{5}$ and 1	A1	
	OR	Obtain value 1 from graphical method, inspection or linear equation	B1	
		Obtain value $-\frac{9}{5}$ similarly	B2	[3]

Q10.

1	Either:	Obtain value $x^3 = 27$ from inspection, equation, …	B1	
		Obtain value $x^3 = 1$ similarly	B2	
		Obtain $x = 1$ and $x = 3$	B1	
	Or:	Attempt to square both sides obtaining 3 terms on LHS	M1	
		Attempt solution for x^3 of 3-term quadratic	DM1	
		Obtain $x^3 = 1$ and $x^3 = 27$	A1	
		Obtain $x = 1$ and $x = 3$	A1	[4]

Q11.

1	Either:	State or imply non-modular inequality $(x+3)^2 < (2x+1)^2$ or corresponding equation or pair of linear equations	B1	
		Attempt solution of 3-term quadratic or of 2 linear equations	M1	
		Obtain critical values $-\frac{4}{3}$ and 2	A1	
		State answer $x < -\frac{4}{3}, x > 2$	A1	
	Or:	Obtain critical value $x = 2$ from graphical method, inspection, equation	B1	
		Obtain critical value $x = -\frac{4}{3}$ similarly	B2	
		State answer $x < -\frac{4}{3}, x > 2$	B1	[4]

Q12.

1	Either	State or imply non-modular equation $(2^x - 7)^2 = 1^2$, or corresponding pair of equations	M1	
		Obtain $2^x = 8$ and $2^x = 6$	A1	
		State answer 3	B1	
		Use logarithmic method to solve an equation of the form $2^x = k$, where $k > 0$	M1	
		State answer 2.58	A1	
	Or	State or imply one value for 2^x, e.g. 8, by solving an equation or by inspection	B1	
		State answer 3	B1	
		State second value for 2^x	B1	
		Use logarithmic method to solve an equation of the form $2^x = k$, where $k > 0$	M1	
		State answer 2.58	A1	[5]

Q13.

2	Either	State or imply non-modular inequality $(x-8)^2 > (2x-4)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a quadratic, or solve two linear equations	M1	
		Obtain critical values 4 and -4	A1	
		State correct answer $-4 < x < 4$	A1	
	Or	Obtain one critical value, e.g. $x = 4$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		Obtain the other critical value similarly	B2	
		State correct answer $-4 < x < 4$	B1	[4]

Q14.

1	*EITHER:*	State or imply non-modular inequality $(2x-1)^2 < (3x)^2$, or corresponding equation	B1	
		Expand and make reasonable solution attempt at 3-term quadratic, or equivalent	M1	
		Obtain critical values -1 and $\frac{1}{5}$	A1	
		State correct answer $x < -1, x > \frac{1}{5}$	A1	
	OR:	State one correct equation for a critical value e.g. $2x - 1 = 3x$	M1	
		State two relevant equations separately e.g. $2x - 1 = 3x$ and $2x - 1 = -3x$	A1	
		Obtain critical values -1 and $\frac{1}{5}$	A1	
		State correct answer $x < -1, x > \frac{1}{5}$	A1	
	OR:	State one critical value (probably $x = -1$), from a graphical method or by inspection or by solving a linear inequality	B1	
		State the other critical value correctly	B2	
		State correct answer $x < -1, x > \frac{1}{5}$	B1	4
		[The answer $\frac{1}{5} < x < -1$ scores B0.]		

Q15.

1	*EITHER:*	State or imply non-modular inequality e.g. $-2 < 8-3x < 2$, or $(8-3x)^2 < 2^2$, or corresponding equation or pair of equations	M1	
		Obtain critical values 2 and $3\frac{1}{3}$	A1	
		State correct answer $2 < x < 3\frac{1}{3}$	A1	
	OR:	State one critical value (probably $x = 2$), from a graphical method or by inspection or by solving a linear equality or equation	B1	
		State the other critical value correctly	B1	
		State correct answer $2 < x < 3\frac{1}{3}$	B1	
				[3]

Q16.

1	*EITHER:*	State or imply non-modular inequality $(x+1)^2 > x^2$ or corresponding quadratic equation or linear equation $x + 1 = -x$	B1	
		Obtain critical value $-\frac{1}{2}$	B1	
		State answer $x > -\frac{1}{2}$	B1	
	OR:	Obtain critical value $-\frac{1}{2}$ by solving a linear inequality or by graphical method or inspection	B2	
		State answer $x > -\frac{1}{2}$	B1	3
		[For $2x + 1 > 0$, $x > +\frac{1}{2}$, or similar reasonable method]	M1	

Q17.

1	Use logarithms to obtain a linear inequality in x, or corresponding equation	M1	
	Obtain critical value 3.11, or exact equivalent	A1	
	Obtain answer $x > 3.11$	A1 ✓	3

Q18.

1	*EITHER:* State or imply non-modular inequality $(2x-1)^2 > x^2$ or corresponding quadratic equation or pair of linear equations $2x-1 = \pm x$	M1	
	Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
	Obtain critical values $x = 1$ and $x = \frac{1}{3}$	A1	
	State answer $x < \frac{1}{3}$, $x > 1$	A1	
	OR: Obtain critical value $x = 1$ from a graphical method, or by inspection, or by solving a linear inequality or linear equation	B1	
	Obtain the critical value $x = \frac{1}{3}$ similarly	B2	
	State answer $x < \frac{1}{3}$, $x > 1$	B1	4

Q19.

3 (i)	Obtain critical values 4 and 6	B1	
	State answer $4 < y < 6$	B1	[2]
(ii)	Use correct method for solving an equation of the form $3^x = a$, where $a > 0$	M1	
	Obtain one critical value, i.e. either 1.26 or 1.63	A1	
	State answer $1.26 < x < 1.63$	A1	[3]

Q20.

1	*EITHER:* State or imply non-modular inequality $(x-3)^2 > (2x)^2$ or corresponding quadratic equation or pair of linear equations $(x-3) = \pm 2x$	M1	
	Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
	Obtain critical values $x = 1$ and $x = -3$	A1	
	State answer $-3 < x < 1$	A1	
	OR: Obtain critical value $x = -3$ from a graphical method, or by inspection, or by solving a linear inequality or linear equation	B1	
	Obtain the critical value $x = 1$ similarly	B2	
	State answer $-3 < x < 1$	B1	[4]

Q21.

1	*EITHER*:	Obtain a non-modular inequality from $(2x+3)^2 < (x-3)^2$, or corresponding quadratic equation, or pair of linear equations $2x+3 = \pm(x-3)$	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = -6$ and $x = 0$	A1	
		State answer $-6 < x < 0$	A1	
	OR:	obtain the critical value $x = -6$ from a graphical method or by inspection, or by solving a linear equation or inequality	B1	
		Obtain the critical value $x = 0$ similarly	B2	
		State answer $-6 < x < 0$	B1	[4]

Q22.

1	*EITHER*:	Obtain a non-modular inequality from $(x+3)^2 > (2x)^2$, or corresponding equation, or pair of linear equations $(x+3) = \pm 2x$	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = -1$ and $x = 3$	A1	
		State answer $-1 < x < 3$	A1	
	OR:	Obtain critical value $x = 3$ from a graphical method, or by inspection, or by solving a linear inequality or linear equation	B1	
		Obtain the critical value $x = -1$ similarly	B2	
		State answer $-1 < x < 3$	B1	[4]

Q23.

1	**EITHER:**	State or imply non-modular inequality $(x+1)^2 > (x-4)^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical value $\frac{3}{2}$	A1	
		State correct answer $x > \frac{3}{2}$	A1	
	OR:	State a correct linear equation for the critical value, e.g. $x+1 = -x+4$, or corresponding correct linear inequality, e.g. $x+1 > -(x-4)$	M1	
		Obtain critical value $\frac{3}{2}$	A1	
		State correct answer $x > \frac{3}{2}$	A1	[3]

Q24.

1	**EITHER**	State or imply non-modular inequality $(3x + 1)^2 > 8^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical values $\frac{7}{3}$ or -3	A1	
		State correct answer $x < -3$ or $x > \frac{7}{3}$	A1	
	OR	State one critical value, e.g. $x = -3$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B1	
		State correct answer $x < -3$ or $x > \frac{7}{3}$	B1	[3]

Q25.

1	**EITHER**	State or imply non-modular inequality $(4 - 5x)^2 < 3^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical values $\frac{1}{5}$ and $\frac{7}{5}$	A1	
		State correct answer $\frac{1}{5} < x < \frac{7}{5}$	A1	
	OR	State one critical value, e.g. $x = \frac{1}{5}$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B1	
		State correct answer $\frac{1}{5} < x < \frac{7}{5}$	B1	[3]

Q26.

1	**EITHER**	State or imply non-modular inequality $(x+2)^2 > \left(\frac{1}{2}x - 2\right)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values -8 and 0	A1	
		State correct answer $x < -8$ or $x > 0$	A1	
	OR	Obtain one critical value, e.g. $x = -8$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		Obtain the other critical value similarly	B2	
		State correct answer $x < -8$ or $x > 0$	B1	[4]

Q27.

2	**EITHER**	State or imply non-modular inequality $(2x - 3)^2 \leqslant (3x)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values –3 and $\frac{3}{5}$	A1	
		State correct answer $x \leqslant -3$ or $x \geqslant \frac{3}{5}$	A1	
	OR	State one critical value, e.g. $x = -3$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		State the other critical value correctly	B2	
		State correct answer $x \leqslant -3$ or $x \geqslant \frac{3}{5}$	B1	[4]

Q28.

1	**EITHER**	State or imply non-modular inequality $(x-2)^2 \geq (x+5)^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical value $-\frac{3}{2}$	A1	
		State correct answer $x \leq -\frac{3}{2}$	A1	
	OR	State a correct linear equation for the critical value, e.g. $x-2=-x-5$, or corresponding correct linear inequality, e.g. $x-2 \geq -x-5$	M1	
		Obtain critical value $-\frac{3}{2}$	A1	
		State correct answer $x \leq -\frac{3}{2}$	A1	[3]

Q29.

1	**EITHER**	State or imply non-modular inequality $(2x+1)^2 < (2x-5)^2$, or corresponding equation or pair of linear equations	M1	
		Obtain critical value 1	A1	
		State correct answer $x < 1$	A1	
	OR	State the critical value $x = 1$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B2	
		State correct answer $x < 1$	B1	[3]

Q30.

1	Either	State or imply non-modular inequality $(x+1)^2 < (3x+5)^2$, or corresponding equation or pair of linear equations	M1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values -2 and $-\frac{3}{2}$	A1	
		State correct answer $x < -2$ or $x > -\frac{3}{2}$	A1	
	Or	Obtain one critical value, e.g. $x = -2$, by solving a linear equation (or inequality) or from a graphical method or by inspection	B1	
		Obtain the other critical value similarly	B2	
		State correct answer $x < -2$ or $x > -\frac{3}{2}$	B1	[4]

Q31.

1	Either	State or imply non-modular inequality $(3x-2)^2 > (x+4)^2$ or corresponding equation or pair of linear equations	B1	
		Attempt solution of 3-term quadratic equation or of 2 linear equations	M1	
		Obtain critical values $-\frac{1}{2}$ and 3	A1	
		State answer $x < -\frac{1}{2}$, $x > 3$	A1	[4]
	Or	Obtain critical value $x = 3$ from graphical method, inspection, equation	B1	
		Obtain critical value $x = -\frac{1}{2}$ similarly	B2	
		State answer $x < -\frac{1}{2}$, $x > 3$	B1	[4]

P3 (variant1 and 3)

Q1.

1	*EITHER:*	State or imply non-modular inequality $(x+3a)^2 > (2(x-2a))^2$, or corresponding quadratic equation, or pair of linear equations $(x+3a) = \pm 2(x-2a)$	B1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = \frac{1}{3}a$ and $x = 7a$	A1	
		State answer $\frac{1}{3}a < x < 7a$	A1	
	OR:	Obtain the critical value $x = 7a$ from a graphical method, or by inspection, or by solving a linear equation or inequality	B1	
		Obtain the critical value $x = \frac{1}{3}a$ similarly	B2	
		State answer $\frac{1}{3}a < x < 7a$	B1	[4]
		[Do not condone $\leqslant$ for $<$; accept 0.33 for $\frac{1}{3}$.]		

Q2.

1	*EITHER*: State or imply non-modular inequality $(x-3)^2 > (2(x+1))^2$, or corresponding quadratic equation, or pair of linear equations $(x-3) = \pm 2(x+1)$	B1		
	Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1		
	Obtain critical values –5 and $\frac{1}{3}$	A1		
	State answer $-5 < x < \frac{1}{3}$	A1		
	OR: Obtain the critical value $x = -5$ from a graphical method, or by inspection, or by solving a linear equation or inequality	B1		
	Obtain the critical value $x = \frac{1}{3}$ similarly	B2		
	State answer $-5 < x < \frac{1}{3}$	B1	[4]	
	[Do not condone ≤ for <; accept 0.33 for $\frac{1}{3}$.]			

Q3.

1	*EITHER*: State or imply non-modular inequality $(4x+3)^2 > x^2$, or corresponding equation or pair of equations $4x + 3 = \pm x$	M1		
	Obtain a critical value, e.g. –1	A1		
	Obtain a second critical value, e.g. $-\frac{3}{5}$	A1		
	State final answer $x < -1, x > -\frac{3}{5}$	A1		
	OR: Obtain critical value $x = -1$, by solving a linear equation or inequality, or from a graphical method or by inspection	B1		
	Obtain the critical value $-\frac{3}{5}$ similarly	B2		
	State final answer $x < -1, x > -\frac{3}{5}$	B1	[4]	
	[Do not condone ≤ or ≥.]			

Q4.

1	*EITHER*:	State or imply non-modular inequality $(2-3x)^2 < (x-3)^2$, or corresponding equation, and make a reasonable solution attempt at a 3-term quadratic	M1	
		Obtain critical value $x = -\frac{1}{2}$	A1	
		Obtain $x > -\frac{1}{2}$	A1	
		Fully justify $x > -\frac{1}{2}$ as only answer	A1	
	*OR*1:	State the relevant critical linear equation, i.e. $2-3x = 3-x$	B1	
		Obtain critical value $x = -\frac{1}{2}$	B1	
		Obtain $x > -\frac{1}{2}$	B1	
		Fully justify $x > -\frac{1}{2}$ as only answer	B1	
	*OR*2:	Obtain the critical value $x = -\frac{1}{2}$ by inspection, or by solving a linear inequality	B2	
		Obtain $x > -\frac{1}{2}$	B1	
		Fully justify $x > -\frac{1}{2}$ as only answer	B1	
	*OR*3:	Make recognisable sketches of $y = 2-3x$ and $y = \lvert x-3 \rvert$ on a single diagram	B1	
		Obtain critical value $x = -\frac{1}{2}$	B1	
		Obtain $x > -\frac{1}{2}$	B1	
		Fully justify $x > -\frac{1}{2}$ as only answer	B1	[4]
		[Condone $\geqslant$ for $>$ in the third mark but not the fourth.]		

Q5.

1	EITHER:	State or imply non-modular inequality $(2(x-3))^2 > (3x+1)^2$, or corresponding quadratic equation, or pair of linear equations $2(x-3) = \pm(3x+1)$	B1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = -7$ and $x = 1$	A1	
		State answer $-7 < x < 1$	A1	
	OR:	Obtain critical value $x = -7$ or $x = 1$ from a graphical method, or by inspection, or by solving a linear equation or inequality	B1	
		Obtain critical values $x = -7$ and $x = 1$	B2	
		State answer $-7 < x < 1$	B1	[4]
		[Do not condone: ‹ for <.]		

Q6.

1	*EITHER*	State or imply non-modular inequality $(3(x-1))^2 < (2x+1)^2$ or corresponding quadratic equation, or pair of linear equations $3(x-1) = \pm(2x+1)$	B1	
		Make reasonable solution attempt at a 3-term quadratic, or solve two linear equations	M1	
		Obtain critical values $x = \frac{2}{5}$ and $x = 4$	A1	
		State answer $\frac{2}{5} < x < 4$	A1	
	OR by	Obtain critical value $x = \frac{2}{5}$ or $x = 4$ from a graphical method, or by inspection, or solving a linear equation or inequality	B1	
		Obtain critical values $x = \frac{2}{5}$ and $x = 4$	B2	
		State answer $\frac{2}{5} < x < 4$ [Do not condone $\leq$ for $<$.]	B1	[4]

Q7.

1	Either	State or imply non-modular inequality $(3x-1)^2 < (2x+5)^2$ or corresponding quadratic equation or pair of linear equations $3x-1 = \pm(2x+5)$	B1	
		Solve a three-term quadratic or two linear equations $5x^2 - 26x - 24 < 0$	M1	
		Obtain $-\frac{4}{5}$ and 6	A1	
		State $-\frac{4}{5} < x < 6$	A1	
	Or	Obtain value 6 from graph, inspection or solving linear equation	B1	
		Obtain value $-\frac{4}{5}$ similarly	B2	
		State $-\frac{4}{5} < x < 6$	B1	[4]