

1			$4x - 5 > 14x + 7$	M1	for correctly multiplying by 7 to eliminate the fraction, including expanding bracket if this step done first	may be earned later; the first two Ms may be earned with an equation or wrong inequality ft wrong first step award 3 marks only if correct answer obtained after equations or inequalities are used with no errors
			$-12 > 10x$ or $-10x > 12$ or ft	M1	for correctly collecting x terms on one side and number terms on the other and simplifying	
			$x < -\frac{12}{10}$ or $-\frac{12}{10} > x$ oe isw or ft	M1	ft their ax [inequality] b , where $b \neq 0$ and $a \neq 0$ or ± 1	
			[3]			

2			$(3x + 1)(x + 3)$	M1	or $3(x + 1/3)(x + 3)$	A0 for combinations with only one part correct eg $-3 > x < -1/3$, though this would earn M1 if not already awarded
			$x < -3$	A1	or for $-1/3$ and -3 found as endpoints eg by use of formula	
			[or]	A1	mark final answers;	
			$x > -1/3$ oe		allow only A1 for $-3 > x > -1/3$ oe as final answer or for $x \leq -3$ and $x \geq -1/3$	
				[3]	if M0, allow SC1 for sketch of parabola the right way up with their solns ft their endpoints	

Question		Answer	Marks	Guidance	
4		$6(2x + 1) < 5(3x + 4)$ $12x + 6 < 15x + 20$ or ft $-14 < 3x$ or $-3x < 14$ or ft $x > -\frac{14}{3}$ oe or ft isw <u>or</u> $\frac{1}{5} - \frac{4}{6} < \frac{3x}{6} - \frac{2x}{5}$ oe $\frac{-7}{15} < \frac{3x}{30}$ oe or ft $x > -\frac{14}{3}$ oe or ft isw	M1 M1 M1 M1 <u>or</u> M1 M2 M1 [4]	for multiplying up correctly or for correct use of a common denominator for expanding brackets correctly; for combined first two steps with one error, such as $12x + 6 < 15x + 4$, allow M1M0 for collecting terms correctly for final division of their inequality with ax on one side, $a \neq 1$ or 0, and non-zero number on the other allow SC3 for $-14/3$ found without correct inequality symbol(s) <u>or</u> M1 for one side correct ft as in previous method	first three Ms may be earned with an equality condone omission of brackets only if then expanded as if brackets present eg $\frac{12x+6}{30} < \frac{15x+20}{30}$ oe earns M1M1 ft from two x terms and two constants allow working with equality and making correct decision at end eg allow last M1 for $x > \frac{14}{-3}$ or $\frac{-14}{3} < x$ isw reminder : $(-14/3, \infty)$ is acceptable notation

5	$x > -13/4$ o.e. isw www	3	condone $x > 13/-4$ or $13/-4 < x$; M2 for $4x > -13$ or M1 for one side of this correct with correct inequality, and B1 for final step ft from their $ax > b$ or $c > dx$ for $a \neq 1$ and $d \neq 1$; if no working shown, allow SC1 for $-13/4$ oe with equals sign or wrong inequality	M1 for $13 > -4x$ (may be followed by $13/-4 > x$, which earns no further credit); $6x + 3 > 2x + 5$ is an error not an MR; can get M1 for $4x > \dots$ following this, and then a possible B1
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6	$x > 5/2$ oe ($-5/-2$ oe not sufft)	2	M1 for $5 < 2x$ or for $5/2$ oe obtained with equation or wrong inequality	M0 for just $-2x < -5$ (not sufft) ; M1 for $x > -5/-2$
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7 (i)	$2 - 2x > 6x + 5$ $-3 > 8x$ o.e. or ft $x < -3/8$ o.e. or ft isw	M1 M1 M1	or $1 - x > 3x + 2.5$ for collecting terms of their inequality correctly on opposite sides eg $-8x > 3$ allow B3 for correct inequality found after working with equation allow SC2 for $-3/8$ o.e. found with equation or wrong inequality
7 (ii)	$-4 < x < 1/2$ o.e.	2	accept as two inequalities M1 for one 'end' correct or for -4 and $1/2$

8	$5x - 3 < 2x + 10$ $3x < 13$ $x < \frac{13}{3}$ o.e.	M1 M1 M1	condone '=' used for first two Ms M0 for just $5x - 3 < 2(x + 5)$ or $-13 < -3x$ or ft or ft; isw further simplification of $13/3$; M0 for just $x < 4.3$
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9	$x < 0$ or $x > 6$ (both required)	2	B1 each; if B0 then M1 for 0 and 6 identified;	2
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10	$x > 9/6$ o.e. or $9/6 < x$ o.e. www isw	3	M2 for $9 < 6x$ or M1 for $-6x < -9$ or $k < 6x$ or $9 < kx$ or $7 + 2 < 5x + x$ [condone \leq for Ms]; if 0, allow SC1 for $9/6$ o.e found	3
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11	$x > 6/4$ o.e. isw	2	M1 for $4x > 6$ or for $6/4$ o.e. found or for their final ans ft their $4x > k$ or $kx > 6$	2
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12	$x > -0.6$ o.e. eg $-3/5 < x$ isw	3	M2 for $-3 < 5x$ or $x > \frac{3}{-5}$ or M1 for $-5x < 3$ or $k < 5x$ or $-3 < kx$ [condone \leq for Ms]; if 0, allow SC1 for -0.6 found	3
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13	$-3 < x < 1$ [condone $x < 1, x > -3$]	4	B3 for -3 and 1 or M1 for $x^2 + 2x - 3$ [< 0] or $(x + 1)^2 < / = 4$ and M1 for $(x + 3)(x - 1)$ or $x = (-2 \pm 4)/2$ or for $(x + 1)$ and ± 2 on opp. sides of eqn or inequality; if 0, then SC1 for one of $x < 1, x > -3$	4
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14	$x > -4.5$ o.e. isw www [M1 for $\times 4$ M1 expand brackets or divide by 3 M1 subtract constant from LHS M1 divide to find x]	4	a cept $-27/6$ or better; 3 for $x = -4.5$ etc or Ms for each of the four steps carried out correctly with inequality [-1 if working with equation] (ft from earlier errors if of comparable difficulty)	4
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15		$(x - 2.5)^2$ o.e. $- 2.5^2 + 8$ $(x - 2.5)^2 + 7/4$ o.e.	M1 M1 A1	for clear attempt at -2.5^2 allow M2A0 for $(x - 2.5) + 7/4$ o.e. with no $(x - 2.5)^2$ seen	
		min $y = 7/4$ o.e. [so above x axis] or commenting $(x - 2.5)^2 \geq 0$	B1	ft, dep on $(x - a)^2 + b$ with b positive; condone starting again, showing $b^2 - 4ac < 0$ or using calculus	4
	ii	correct symmetrical quadratic shape 8 marked as intercept on y axis tp $(5/2, 7/4)$ o.e. or ft from (i)	G1 G1 G1	or $(0, 8)$ seen in table	3
	iii	$x^2 - 5x - 6$ seen or used -1 and 6 obtained $x < -1$ and $x > 6$ isw or ft their solns	M1 M1 M1	or $(x - 2.5)^2$ [$>$ or $=$] 12.25 or ft $14 - b$ also implies first M1 if M0, allow B1 for one of $x < -1$ and $x > 6$	3
iv	min = $(2.5, -8.25)$ or ft from (i) so yes, crosses	M1 A1	or M1 for other clear comment re translated 10 down and A1 for referring to min in (i) or graph in (ii); or M1 for correct method for solving $x^2 - 5x - 2 = 0$ or using $b^2 - 4ac$ with this and A1 for showing real solns eg $b^2 - 4ac = 33$; allow M1A0 for valid comment but error in -8.25 ft; allow M1 for showing y can be neg eg $(0, -2)$ found and A1 for correct conclusion	2	