Question	Scheme		Marks
1	Either	Or	
	$y^2 = 4 - 4x + x^2$	$x^2 = 4 - 4y + y^2$	M1
	$4(4 - 4x + x^2) - x^2 = 11$ or $4(2-x)^2 - x^2 = 11$	$4y^2 - (4 - 4y + y^2) = 11$ or $4y^2 - (2-y)^2 = 11$	M1
	$3x^2 - 16x + 5 = 0$	$3y^2 + 4y - 15 = 0$ Correct 3 terms	A1
	$(3x-1)(x-5) = 0, \quad x = ...$	$(3y-5)(y+3) = 0, \quad y = ...$	M1
	$x = \frac{1}{3} \quad x = 5$	$y = \frac{5}{3} \quad y = -3$	A1
	$y = \frac{5}{3} \quad y = -3$	$x = \frac{1}{3} \quad x = 5$	M1A1
			(7 marks)

4(a)	$x^2 - 4k(1-2x) + 5k(=0)$ So $x^2 + 8kx + k = 0$ *	M1 A1cso **(2)**
4(b)	$(8k)^2 - 4k$ $k = \frac{1}{16}$ (oe)	M1A1 A1 **(3)**
4(c)	$x^2 + \frac{1}{2}x + \frac{1}{16} = 0$ so $(x + \frac{1}{4})^2 = 0 \Rightarrow x =$ $x = -\frac{1}{4}, y = 1\frac{1}{2}$	M1 A1A1 **(3)**
		(8 marks)

Question	Scheme	Marks
6(a)	$6x + x > 1 - 8$ $x > -1$ $\{x : x > -1\}$	M1 A1 **(2)**
6(b)	$(x + 3)(3x - 1)\ [= 0] \Rightarrow x = -3$ and $\frac{1}{3}$ $-3 < x < \frac{1}{3}$ $\{x : x > -3\} \cap \{x : x < 1/3\}$	M1A1 M1 A1 **(4)**
		(6 marks)
7(a)	$3x - 7 > 3 - x$ $4x > 10$ $x > 2.5,$ – – $\{x : x > 2.5\}$	M1 A1 **(2)**
7(b)	Obtain $x^2 - 9x - 36$ and attempt to sol e.g. $(x-12)(x+3) = 0$ so $x = 12,\ -3$ $-3 \leq x \leq 12$ $\{x : x \leq -3\} \cap \{x : x \leq 12\}$	M1 M1 A1 A1 **(4)**
7(c)	$2.5 < x \leq 12$ $\{x : x \leq 2.5\} \cap \{x : x \leq 12\}$	A1cso **(1)**
		(7 marks)

Question	Scheme	Marks
9(a)	**Method 1:** Attempts $b^2 - 4ac$ for $a = (k+3)$, $b = 6$ and their c $\quad c \neq k$ $b^2 - 4ac = 6^2 - 4(k+3)(k-5)$ $(b^2 - 4ac =) \quad -4k^2 + 8k + 96$ or $-(b^2 - 4ac =) \quad 4k^2 - 8k - 96$ (with no prior algebraic errors) As $b^2 - 4ac > 0$, then $-4k^2 + 8k + 96 > 0$ and so, $k^2 - 2k - 24 < 0$ **Method 2:** Considers $b^2 > 4ac$ for $a = (k+3)$, $b = 6$ and their c $\quad c \neq k$ $6^2 > 4(k+3)(k-5)$ $4k^2 - 8k - 96 < 0$ or $-4k^2 + 8k + 96 > 0$ or $9 > (k+3)(k-5)$ (with no prior algebraic errors) and so, $k^2 - 2k - 24 < 0$ following correct work	M1 A1 B1 A1 M1 A1 B1 A1 **(4)**
9(b)	Attempts to solve $k^2 - 2k - 24 = 0$ to give $k =$ ($\Rightarrow$ Critical values, $k = 6, -4.$) $k^2 - 2k - 24 < 0$ gives $-4 < k < 6$	M1 M1A1 **(3)**
		(7 marks)
10(a)	$b^2 - 4ac < 0 \Rightarrow$ e.g. $4^2 - 4(p-1)(p-5) < 0$ or $0 > 4^2 - 4(p-1)(p-5)$ or $4^2 < 4(p-1)(p-5)$ or $4(p-1)(p-5) > 4^2$ $4 < p^2 - 6p + 5$ $p^2 - 6p + 1 > 0$	M1 A1 A1* **(3)**
10(b)	$p^2 - 6p + 1 = 0 \Rightarrow p = ...$ $p = 3 \pm \sqrt{8}$ $p < 3 - \sqrt{8}$ or $p > 3 + \sqrt{8}$	M1 A1 M1A1 **(4)**
		(7 marks)

Question	Scheme	Marks
11(a)	$2px^2-6px+4p"="3x-7$ or $y=2p\left(\frac{y+7}{3}\right)^2-6p\left(\frac{y+7}{3}\right)+4p$ **Examples** $2px^2-6px+4p-3x+7(=0),\quad -2px^2+6px-4p+3x-7(=0)$ $2p\left(\frac{y+7}{3}\right)^2-6p\left(\frac{y+7}{3}\right)+4p-y(=0),\quad 2py^2+(10p-9)y+8p(=0)$ $y=2px^2-6px+4p-3x+7$ E.g. $b^2-4ac=(-6p-3)^2-4(2p)(4p+7)$, $b^2-4ac=(10p-9)^2-4(2p)(8p)$ $4p^2-20p+9<0$ *	M1 dM1 ddM1 A1* **(4)**
11(b)	$(2p-9)(2p-1)=0\Rightarrow p=...$ to obtain $p=$ $p=\frac{9}{2},\quad \frac{1}{2}$ $\frac{1}{2}<p<4\frac{1}{2}$	M1 A1 M1 A1 **(4)**
		(8 marks)
12(a)	$P=20x+6$ o.e $20x+6>40\Rightarrow x>$ $x>1.7$	B1 M1 A1* **(3)**
12(b)	Mark parts (b) and (c) together $A=2x(2x+1)+2x(6x+3)=16x^2+8x$ $16x^2+8x-120<0$ Try to solve their $2x^2+x-15=0$ e.g. $(2x-5)(x+3)=0$ so $x=$ Choose inside region $-3<x<\frac{5}{2}$ or $0<x<\frac{5}{2}$ (as x is a length)	B1 M1 M1 M1 A1 **(5)**
12(c)	$1.7<x<\frac{5}{2}$	B1cao **(1)**
		(9 marks)