1	(c)	$5x - 3 = 4(2x + 3)$ oe **or** $\frac{5x}{4} - \frac{3}{4} = 2x + 3$ oe		3	M1	for correctly removing the denominator, condone missing brackets
		e.g. $5x - 8x = 12 + 3$ **or** $-3x = 12 + 3$ **or** $8x - 5x = -12 - 3$ **or** $3x = -12 - 3$ **or** $-\frac{3}{4} - 3 = 2x - \frac{5x}{4}$ **or** $-\frac{15}{4} = \frac{3x}{4}$			M1	for a correct rearrangement with terms in x on one side and numbers on the other, allow correct rearrangement of their equation in the form $ax + b = cx + d$
			-5		A1	dep on at least M1 SCB2 for an answer of $x = -2$ coming from $5x - 3 = 8x + 3$ **or** $x = 5$ coming from $5x - 3 = 2x + 12$

2	(a)	$20 - 5x$ $(= 7 - 3x)$		3	M1	for expansion of bracket
		E.g. $20 - 7 = -3x + 5x$ or $-5x + 3x = 7 - 20$			M1	ft from a 4-term equation for a correct process of isolating terms in x on one side of the equation and numbers on the other side
			6.5 oe		A1	dep on M1 awarded and from correct working

3	c	eg $12 \times \frac{4x-2}{3} - 12 \times \frac{5-3x}{4} = 12 \times 6$ **or** eg $4(4x - 2) - 3(5 - 3x) = 12 \times 6$ **or** eg $\frac{4(4x-2)}{12} - \frac{3(5-3x)}{12} (= 6)$ **or** eg $\frac{4(4x-2)-3(5-3x)}{12} (= 6)$ oe			M1	for clear intention to multiply **all** terms by 12 or a multiple of 12 **or** to express LHS as two fractions over 12 or a multiple of 12 or as a single fraction with a denominator of 12 or a multiple of 12 (if expanded numerator, allow one sign error)
		eg $16x - 8 - 15 + 9x = 6 \times 12$			M1	expanding brackets and multiplying both sides by denominator with no more than one sign error
		eg $16x + 9x = 72 + 8 + 15$			M1	for correct rearrangement of a correct equation with terms in x isolated
			3.8	4	A1	oe, award full marks for a correct answer if at least M1 scored

4	(a)	eg $\frac{2(4-3x)}{10} - \frac{5(3x-5)}{10} = -3$ oe or $2(4 - 3x) - 5(3x - 5) = -3 \times 2 \times 5$		3	M1	Correct fractions over common denominator as an equation or Multiplying both sides by 10
		$8 - 6x - 15x + 25 = -30$ oe			M1	A correct equation with no denominators or brackets
			3		A1	dep on M1
	(b)	$(5y + 8)(y - 5)$ (≤ 0) or $(y =) \frac{--17 \pm \sqrt{(-17)^2 - 4 \times 5 \times -40}}{2 \times 5}$		3	M1	Correct method to solve 3 term quadratic – factorising or correct use of formula
		-1.6, 5 oe			A1	Correct critical values
			$-1.6 \leq y \leq 5$ oe		A1	Condone change of variable in place of y throughout this question.
						Total 6 marks

5	(b)	$4x^2 + 10x + 10x + 25 = 4x^2 - 2x + 6x - 3$ $4x^2 + 20x + 25 = 4x^2 + 4x - 3$		3	M1	Correct expansion of $(2x + 5)^2$ **or** $(2x + 3)(2x - 1)$ **or** expansion of **both** sets of brackets with at least 3 of 4 terms correct in both (NB: if written as a 3 term quadratic (and not seen as 4 terms) then the middle term must be correct as it is equivalent to 2 correct terms) (eg (RHS) $4x^2 + 4x + 3$ has 1 error, $2x^2 + 4x - 3$ has 1 error, $4x^2 + 10x - 3$ has 2 errors)
		$10x + 10x - 6x + 2x = -3 - 25$ **or** $3 + 25 = -16x$ **or** $16x = -28$ oe			M1	ft if previous mark awarded. For terms in x on one side and number terms on the other side in a correct ft equation dependent on a linear equation
		Working not required, so correct answer scores full marks (unless from obvious incorrect working eg -1.75 oe from $2x^2 + 20x + 25 = 2x^2 + 4x - 3$ scores M2A0)	-1.75		A1	**or** $-1\frac{3}{4}$ **or** $-\frac{7}{4}$ **or** $-\frac{28}{16}$ **or** $-1\frac{12}{16}$ oe

6	(b)	$4\times(4-3x)=5-8x$ oe **or** $16-12x=5-8x$ oe **or** $4-3x=\frac{5}{4}-2x$ oe		3	M1	for removal of fraction in a correct equation
		e.g. $16-5=12x-8x$ **or** $11=4x$ oe **or** $4-\frac{5}{4}=3x-2x$			M1	for terms in x on one side **and** numbers on the other side in an equation, allow correct rearrangement of their equation in the form $ax+b=cx+d$
			2.75		A1	(dep on M1) oe e.g. $2\frac{3}{4}$ or $\frac{11}{4}$

7	(a)	eg $20\times\frac{9a-7}{5}-20\times\frac{3a-7}{4}=20\times4.55\,(=91)$ or eg $4(9a-7)-5(3a-7)=20\times4.55$ or eg $\frac{4(9a-7)}{20}-\frac{5(3a-7)}{20}\,(=4.55)$ or eg $\frac{4(9a-7)-5(3a-7)}{20}\,(=4.55)$		3	M1	For clear intention to multiply all terms by 20 (or 4 × 5) or a multiple of 20 oe or to express LHS as two fractions over 20 (or 4 × 5) or a multiple of 20 oe or as a single fraction with a denominator of 20 (or 4 × 5) or a multiple of 20 oe if expanded numerator, allow one error
		eg $36a-28-15a+35=20\times4.55$ or $21a=84$ oe			M1	Expanding brackets and multiplying by denominator with no more than one sign error
			4		A1	dep on M1

8	(a)	eg $10p=3p-5$ **or** $p=\frac{3p}{10}-\frac{5}{10}$ oe eg $p=0.3p-0.5$		3	M1	for a correct first step – multiplying both sides by 10 correctly or writing the RHS as 2 terms each over 10 or each term as a decimal [must be in a correct equation]
		eg $10p-3p=-5$ **or** $7p=-5$ **or** $p-\frac{3p}{10}=-\frac{5}{10}$ **or** $0.7p=-0.5$			M1ft	(ft a 3 term equation) for collecting terms in p on one side and number the other
			$-\frac{5}{7}$		A1	(dep on at least M1) for $-\frac{5}{7}$ oe, accept −0.71(4...) allow –0.7 if you have seen $-\frac{5}{7}$ or $-5\div7$

9	(b)	$8x-12$ **or** $\frac{3}{4}x-\frac{5}{4}$ oe or $0.75x-1.25$ oe		3	M1 for correct multiplication by 4 **or** separate fractions on the RHS
		$8x-3x=-5+12$ oe or $5x=7$ oe **or** $2x-\frac{3}{4}x=-\frac{5}{4}+3$ or $2x-0.75x=-1.25-3$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
			$\frac{7}{5}$		A1 oe dep on M1 1.4 or $1\frac{2}{5}$ oe

10	$7\times2.7\,(=18.9)$ or $4\times3.3\,(=13.2)$ or $\frac{3W+4\times3.3}{7}=2.7$ oe eg $3W+13.2=18.9$		3	M1	For one correct product or for a correct equation for W
	$\frac{7\times2.7-4\times3.3}{3}$ or $\frac{"18.9"-"13.2"}{3}$ or $\frac{5.7}{3}$ or $3W=5.7$			M1	
	If you see 1.9 from correct working and they do further work to this value, award M2	1.9		A1	

11 (a)	eg $\frac{2(4x+5)-3(3-2x)}{6}(=13)$ oe or $\frac{2(4x+5)}{6}-\frac{3(3-2x)}{6}(=13)$ $2(4x+5)-3(3-2x)=13\times3\times2$ oe		4	M1	Writing fractions over a common denominator or removing denominator If the student has removed the denominator at this stage then a correct method must be shown or implied	Allow one error in removal of brackets
	eg $8x+10-9+6x=78$ oe eg $14x+1=78$			M1ft	ft dep on previous M1 removing brackets and fractions correctly in an equation	
	eg $8x+6x=78-10+9$ oe eg $14x=77$			M1ft	ft dep on previous M1 terms in x on one side and number terms the other	
		5.5		A1	oe eg $\frac{11}{2}$ **dep on M2**	

12 (b)	$12x-10$ **or** $2(6x-5)=4x-7$ **or** $6x-5=\frac{4}{2}x-\frac{7}{2}$ oe		3	M1 for removal of fraction **and** multiplying out LHS **or** rearranging to remove the fraction **or** separating fraction (RHS) in an equation
	$12x-4x=-7+10$ oe **or** $6x-\frac{4}{2}x=-\frac{7}{2}+5$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
		$\frac{3}{8}$		A1 (dep M1) oe

13	$(v=)\ 12t^2-27\ (=0)$		5	M1	Correct differentiation
	$t^2=\frac{27}{12}\ (=\frac{9}{4})$ oe **or** $(3)(2t+3)(2t-3)\ (=0)$			M1	dep M1 first stage to solve $v=0$ by rearranging, factorising, quadratic formula, or completing the square
	$\sqrt{\frac{9}{4}}$ oe $(=\frac{3}{2})$ **or** $\pm\sqrt{\frac{9}{4}}$ oe $(=\pm\frac{3}{2})$			A1	Correct value of t (allow $\pm$)
	$(a=)\ 24t$			M1	dep 1st M1 for differentiating v
		36		A1	correct answer
					Total 5 marks

14	$6-12x$ or $2-4x=\frac{5}{3}-\frac{8}{3}x$		3	M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms
	$6-5=12x-8x$ or $1=4x$ or $-12x+8x=5-6$ oe or $-4x=-1$ or $\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
	Working required	$\frac{1}{4}$		A1 oe dep on M1 awarded
				Total 3 marks

15	eg $5x-1=3x+7.4$ oe **or** eg $10x-2+48$ **or** $6x+14.8+48$ **or** $24+24+5x-1+3x+7.4$ oe		4	M1 a correct equation to find x **or** a correct expression for the perimeter in terms of x
	$x=4.2$			A1 the correct value of x (implies previous mark)
	$2\times24+2(5\times$ "4.2" $-1)$ oe **or** $2\times24+2(3\times$ "4.2" $+7.4)$ oe **or** $2\times24+(5\times4.2-1)+(3\times4.2+7.4)$ oe eg $24+24+20+20$ oe			M1dep on a correct method to find the perimeter – use of positive x from correct working (1st M1 awarded for an equation) **and** only if used the same measurement for AD and BC
	working required	88		A1 cao dep on either M1 or $x=4.2$
				Total 4 marks

16	eg $20\times\frac{x+3}{4}-20\times\frac{7-x}{5}=20\times4.3$ or eg $5(x+3)-4(7-x)=20\times4.3$ or eg $\frac{5(x+3)}{20}-\frac{4(7-x)}{20}(=4.3)$ or eg $\frac{5(x+3)-4(7-x)}{20}(=4.3)$		3	M1	For clear intention to multiply all terms by 20 (or 4 × 5) or a multiple of 20 oe or to express LHS as two fractions over 20 (or 4 × 5) or a multiple of 20 oe or as a single fraction with a denominator of 20 (or 4 × 5) or a multiple of 20 oe if expanded numerator, allow one error
	eg $5x + 15 - 28 + 4x = 4.3 \times 20$ oe eg $9x - 13 = 86$ eg $9x = 99$			M1	Expanding brackets and multiplying by denominator with no more than one error in total from multiplying out brackets [we must see 4.3 × 20 or 86 accurately]
	Working required	11		A1	dep on M1
					Total 3 marks

17	$(4x - 27) + (3x + 46) = 180$ oe or "expression for C" + $(3x + 10) = 180$ **or** $7x+19=180$ **or** $3x + 46 + 4x - 27 + 3x + 10 +$ ["180 – $(3x + 10)$"]$= 360$		4	M1	Sum angles *A* and *B* to 180, or find an expression for *BCD* and sum all angles to 360. [condone missing brackets and condone use of any letter or expression for angle *C* (even *x* or *BCD*)]
				A1	$x = 23$
	eg $3 \times$"23" + 46 (= 115) **or** eg $180 - (3 \times$"23" + 10) (= 101)			M1ft	dep on M1 using **their *x*** to calculate a value for angle *B* or 'their' *C* (cannot be a negative value and cannot just be *x*)
	Correct answer scores full marks (unless from obvious incorrect working)	115		A1	Allow $3x + 46$ or *ABC* if 115 is clearly seen in working or on diagram
					Total 4 marks

18	(c)	eg $30\times\frac{1-2y}{3}=30\times\frac{4}{5}-30\times\frac{2y-1}{2}$ oe or eg $\frac{10(1-2y)}{30}=\frac{6\times4}{30}-\frac{15(2y-1)}{30}$ oe or eg $\frac{1-2y}{3}=\frac{2\times4}{10}-\frac{5(2y-1)}{10}$ oe or eg $10(1-2y)=3\times2\times4-3\times5(2y-1)$ oe or eg $\frac{10(1-2y)+15(2y-1)}{30}=\frac{4}{5}$ or $\frac{2(1-2y)}{6}+\frac{3(2y-1)}{6}=\frac{4}{5}$ oe (as above)		3	M1	For clear intention to multiply all terms by 30 (or 3 × 5 × 2) or a multiple of 30 oe in an equation or to express all terms over 30 (or 3 × 5 × 2) or a multiple of 30 oe in an equation **or** writing RHS over 10 or a multiple of 10 or 'cross multiplying' in an equation **or** bringing terms in *y* on LHS side and leaving $\frac{4}{5}$ on RHS and writing terms on LHS over 6 or a multiple of 6 in an equation [if expanded numerators, allow one error]
		eg $10 - 20y = 24 - 30y + 15$ oe eg $10y = 29$ or $50 - 100y + 150y - 75 = 120$ oe or $10 - 20y + 30y - 15 = 24$ oe $2 - 4y + 6y - 3 = 4.8$			M1	(ft if only one error) Expanding brackets and multiplying by denominator with no more than one error in total
		Working required	2.9		A1	oe eg $\frac{29}{10}$ or $2\frac{9}{10}$ dep on M2