Question	Answer	Mark	Comments
1	$\frac{7}{x}$	B1	

Question	Answer	Mark	Comments
2	**Alternative method 1: substitutes $2f$ for d**		
	$\frac{e-f}{2f-e}=\frac{1}{4}$ or $2f-e=4(e-f)$	M1	oe equation in e and f
	$6f=5e$ or $\frac{e}{f}=\frac{6}{5}$	M1dep	oe with variables collected eg $1.5f=1.25e$ oe with single fractions eg $\frac{f}{5}=\frac{e}{6}$
	6 : 5	A1	oe ratio
	Alternative method 2: substitutes $\frac{d}{2}$ for f		
	$d-e=4(e-\frac{d}{2})$ or $3d=5e$	M1	oe equation in d and e
	$6f=5e$ or $\frac{e}{f}=\frac{6}{5}$	M1dep	oe with variables collected eg $1.5f=1.25e$ oe with single fractions eg $\frac{f}{5}=\frac{e}{6}$
	6 : 5	A1	oe ratio
	Alternative method 3: substitutes $2f$ for d and forms simultaneous equations		
	$e-f=1$ and $2f-e=4$	M1	oe with rhs in the ratio 1 : 4 eg $e-f=2$ and $2f-e=8$
	$f=5$ or $e=6$	M1dep	correct solution for one unknown from their correct simultaneous equations eg $f=10$ or $e=12$ from above equations
	6 : 5	A1	oe ratio
	Additional Guidance		
	5 : 6 with no method marks awarded		M0M0A0

Q	Answer	Mark	Comments
3	$\frac{731}{x}+\frac{287}{x-24}=2$	M1	oe equation
	$731(x-24)+287x$ or $731x-17\,544+287x$	M1dep	oe allow with denominator $x(x-24)$ oe
	$2x^2-1066x+17\,544\ (=0)$ or $x^2-533x+8772\ (=0)$	A1	oe eg $x^2-533x=-8772$
	$\frac{-(-1066)\pm\sqrt{(-1066)^2-4\times2\times17\,544}}{2\times2}$ or $\frac{1066\pm\sqrt{1\,136\,356-140\,352}}{2\times2}$ or $\frac{1066\pm\sqrt{996\,004}}{2\times2}$ or $\frac{1066\pm998}{2\times2}$ or $(2x-34)(x-516)$ or 17 and 516	M1	ft their 3-term quadratic oe eg $\frac{-(-533)\pm\sqrt{(-533)^2-4\times1\times8772}}{2\times1}$ or $\frac{533\pm\sqrt{284\,089-35\,088}}{2\times1}$ or $\frac{533\pm\sqrt{249\,001}}{2\times1}$ or $\frac{533\pm499}{2}$ or $(x-17)(x-516)$
	516	A1	must discard 17
	Additional Guidance		
	First M1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	3rd M1 Allow ft of their 3-term quadratic even if discriminant is $\leqslant 0$		
	In quadratic formula, allow eg 1066^2 for $(-1066)^2$		

Q	Answer	Mark	Comment
4(a)	$\left(\frac{6}{a} =\right) \frac{24}{4a}$ or converts both fractions to a common denominator or correct unsimplified fraction eg $\frac{26}{8a}$ or $\frac{13a}{4a^2}$ or $\frac{3.25}{a}$	M1	oe eg $\frac{48}{8a}$ and $\frac{22}{8a}$ or $\frac{24a}{4a^2}$ and $\frac{11a}{4a^2}$
	$\frac{13}{4a}$	A1	
	Additional Guidance		
	Do not ignore further work eg $\frac{13}{4a}$ followed by answer $\frac{3.25}{a}$		M1A0
	Allow a division sign rather than a fraction line for M1 only eg $26 \div 8a$ eg $13 \div 4a$		M1A0 M1A0

Q	Answer	Mark	Comment
4(b)	$y(y-3)$	M1	
	$(y+7)(y+3)$	M1	
	$(y+3)(y-3)$	M1	
	$y(y+7)$ or y^2+7y	A1	SC1 $y^4-3y^3+10y^3-30y^2+21y^2-63y$ or $y^4+7y^3-9y^2-63y$
	Additional Guidance		
	$y(y+7)$ or y^2+7y with no other working		M1M1M1A1
	Answer $\frac{y(y+7)}{1}$ or $\frac{y^2+7y}{1}$		M1M1M1A0
	Ignore the consistent use of a different variable within a factorisation		
	Award SC1 only if there are no correct factorisations eg correct factorisation to $(y+7)(y+3)$ and correct expansion to $y^4-3y^3+10y^3-30y^2+21y^2-63y$		M1 only

Q	Answer	Mark	Comments
5	$\frac{(x-5)(x+2)}{(x-2)(x+2)}$ and $\frac{(x+5)(x-2)}{(x+2)(x-2)}$	M1	$(x-2)(x+2)$ or $x^2-2x+2x-4$ must be seen (expansion may be seen in a grid) brackets in any order if the brackets are not shown for the numerators, expansions must be correct may be seen as a single fraction
	$x^2-5x+2x-10$ or $x^2-3x-10$ or $x^2+5x-2x-10$ or $x^2+3x-10$	M1	correct expansion of $(x-5)(x+2)$ or $(x+5)(x-2)$ ignore denominators may be seen in a grid implied by $2x^2-20$ if no errors seen in expansions
	M2 seen with no errors and $\frac{2x^2-20}{x^2-4}$	A1	allow M2 seen with no errors and $a=2$ $b=20$

Additional Guidance

Missing brackets must be recovered but condone missing closing bracket at the end of a numerator or denominator eg $\frac{(x-5)(x+2)}{(x-2)(x+2)}+\frac{(x+5)(x-2)}{(x+2)(x-2}$	1st M1
2nd M1 is awarded for four correct terms even if subsequently simplified incorrectly	
For terms seen in a grid, signs must be correct (allow eg $2x$ for $+2x$)	
For 1st M1 allow multiplication signs	
After M2A1 ignore incorrect values stated eg $a=2$ $b=-20$	
$\frac{2x^2-20}{x^2-4}$ may come from wrong working or incomplete working eg $\frac{(x-5)(x+2)}{(x-2)(x+2)}+\frac{(x+5)(x-2)}{(x+2)(x-2)}$ $\frac{x^2-10+x^2-10}{x^2-4}=\frac{2x^2-20}{x^2-4}$	M1 M0A0

Q	Answer	Mark	Comment
6	$\frac{6}{3(x+1)}$ or $\frac{(7-5x)(x+1)}{3(x+1)}$ or $\frac{3\times 4x(x+1)}{3(x+1)}$	M1	oe one correct term with possible common denominator
	$\frac{6}{3(x+1)}$ and $\frac{(7-5x)(x+1)}{3(x+1)}$ and $\frac{3\times 4x(x+1)}{3(x+1)}$	M1dep	oe all terms correct with common denominator may be a single fraction
	$\frac{6}{3(x+1)} + \frac{7x+7-5x^2-5x}{3(x+1)} + \frac{12x^2+12x}{3(x+1)}$	M1dep	oe all terms correct with common denominator and brackets on numerator expanded
	$\frac{7x^2+14x+13}{3(x+1)}$	A1	SC3 $7x^2 + 14x + 13 (= 0)$ or $\frac{7x^2+14x+13}{3x+1}$
	Additional Guidance		
	Do not award A mark if further incorrect simplification is seen after a correct answer		
	$3(x + 1)$ can be $3x + 3$ throughout		