

Q1. (2019)

20	Alternative method 1		
	$\frac{n^2+n}{2}$ or $\frac{n^2+2n+n+2}{2}$ or $\frac{n^2+3n+2}{2}$	M1	may be seen in stages eg n^2+n followed by $\frac{n^2+n}{2}$
	$\frac{n^2+n}{2}$ and $\frac{n^2+2n+n+2}{2}$ or $\frac{n^2+n}{2}$ and $\frac{n^2+3n+2}{2}$	M1dep	may be seen in stages eg n^2+n followed by $\frac{n^2+n}{2}$ and n^2+3n+2 followed by $\frac{n^2+3n+2}{2}$ implies M2
	$\frac{2n^2+4n+2}{2}$ or n^2+2n+1 with M2 seen	A1	oe single fraction with terms collected eg $\frac{4n^2+8n+4}{4}$
	n^2+2n+1 and $(n+1)^2$ with M2A1 seen	A1	allow $(n+1)(n+1)$ for $(n+1)^2$
	Alternative method 2		
	$\frac{n+1}{2}(n+n+2)$	M1	oe eg $(n+1)\left(\frac{n}{2}+\frac{n+2}{2}\right)$
	$\frac{n+1}{2}(2n+2)$ or $\frac{n^2+n}{2} + \frac{n^2+n}{2} + \frac{2n+2}{2}$ with M1 seen	M1dep	
	$\frac{2n^2+4n+2}{2}$ or n^2+2n+1 with M2 seen	A1	oe single fraction with terms collected eg $\frac{4n^2+8n+4}{4}$
	n^2+2n+1 and $(n+1)^2$ with M2A1 seen	A1	allow $(n+1)(n+1)$ for $(n+1)^2$
20 cont	Alternative method 3		
	$\frac{n+1}{2}(n+n+2)$	M1	oe eg $(n+1)\left(\frac{n}{2}+\frac{n+2}{2}\right)$
	$\frac{n+1}{2}(2n+2)$ with M1 seen	M1dep	oe eg $\frac{(n+1)(2n+2)}{2}$
	$(n+1)^2$ with M2 seen	A2	A1 $2(n+1)\frac{n+1}{2}$ or $\frac{2(n+1)^2}{2}$ allow $(n+1)(n+1)$ for $(n+1)^2$

20 cont	Additional Guidance	
	Only substituting in values of n	M0M0A0A0
	Consistently using a different letter to n can score up to M1M1A1A1	
	Using two different letters consistently within the two fractions (eg n replaced by x in the first equation and n replaced by y in the second equation) can score a maximum of M1M1A0A0 unless recovered to the same letter	
	Multiplying fractions instead of adding can score a maximum of M2A0	
	For M marks condone eg n^2 for $2n$ etc	
	$n^2 + n/2$ and $n^2 + 3n + 2/2$ recovered to $\frac{2n^2 + 4n + 2}{2}$ and/or $n^2 + 2n + 1$ and/or $(n + 1)^2$	M1M1A0A0
	$n^2 + n/2$ and $n^2 + 3n + 2/2$ not recovered	M0M0A0A0
	$n^2 + n$ and $n^2 + 3n + 2$ recovered to $\frac{2n^2 + 4n + 2}{2}$ and/or $n^2 + 2n + 1$ and/or $(n + 1)^2$	M1M1A0A0
	$n^2 + n$ and $n^2 + 3n + 2$ not recovered	M0M0A0A0
	Equating to n^2 in working can score a maximum of M1M1A0A0 (equating to eg x^2 can score up to M1M1A1A1)	
	$1n$ is allowed for n throughout	
	Alts 2 and 3 $\frac{n+1}{2}(2n+2)$ with M1 seen scores M2 If they attempt to expand $(n+1)(2n+2)$ use Alt 2 If they attempt to expand $\frac{1}{2}(2n+2)$ use Alt 3	

Q2. (2020)

Q	Answer	Mark	Comments
4	a^2	B1	
	Additional Guidance		

Q3. (2020)

Q	Answer	Mark	Comments
19	$4a + 2b$ and $10a + 5b$	M1	
	$2(2a + b)$ or $5(2a + b)$	M1	
	$\frac{2(2a + b)}{5(2a + b)}$ and $\frac{2}{5}$ or $\frac{2(2a + b)}{5(2a + b)}$ and 0.4	A1	
	Additional Guidance		
	$\frac{2}{5}$ with no working or only from substitution of values		M0M0A0
	Ignore substitution of values eg $\frac{2(2a + b)}{5(2a + b)} = \frac{2}{5}$ followed by substitution of values		M1M1A1
	$\frac{4a + 2b}{10a + 4b} = \frac{2}{5}$		M1M0A0
	$2b + 4a$ and $5b + 10a$ are equivalent to $4a + 2b$ and $10a + 5b$ etc		

Q4. (2021)

Q	Answer	Mark	Comments
21	$9x^2 + 3x + 3x + 1$ or $9x^2 + 6x + 1$ or $-(8x^2 - 6x)$ or $-8x^2 + 6x$	M1	
	$35 + 9x^2 + 3x + 3x + 1 - 8x^2 + 6x$ or $35 + 9x^2 + 6x + 1 - 8x^2 + 6x$	M1dep	
	$x^2 + 12x + 36$	A1	
	$(x + 6)^2$	A1	allow $(x + 6)(x + 6)$
	Additional Guidance		
	Condone inclusion of $= 0$ in all working		
	Ignore any solution attempt for $(x + 6)^2 = 0$		
	Ignore substitution of values		

Q5. (2023)

$$(a - 3)x^2 + 2b \equiv 5x^2 + 12$$

Compare the coefficients on both sides:

$$-a - 3 = 5$$

$$a = 5 + 3 = \boxed{8}$$

$$-2b = 12$$

$$b = \frac{12}{-2} = \boxed{-6}$$

Final answers:

$$\boxed{a = 8, \quad b = -6}$$

Q5. (2023)

Q	Answer	Mark	Comments
15	$2x^3 - 18x^2y + 5x^2y - 45xy^2$	M1	exactly 4 terms with 3 correct terms in any order may be seen in a grid implied by $2x^3 - 13x^2y$ with one other term or $-13x^2y - 45xy^2$ with one other term
	$2x^3 - 18x^2y + 5x^2y - 45xy^2$ or $2x^3 - 13x^2y - 45xy^2$	A1	terms in any order do not allow if only seen in a grid
	Additional Guidance		
	A correct term includes the sign (in a grid allow eg $5x^2y$ for $+5x^2y$)		
	Condone four correct terms followed by incorrect simplification of x^2y terms, otherwise do not allow further incorrect work eg1 $2x^3 - 18x^2y + 5x^2y - 45xy^2 = 2x^3 + 13x^2y - 45xy^2$ eg2 $2x^3 - 18x^2y + 5x^2y - 45xy^2 = 36x^5y + 5x^2y - 45xy^2$		M1A1 M1A0
	Allow equivalent fully simplified terms eg $5x^2y$ may be seen as $5yx^2$		
	For M1 allow coefficients to be incorrectly positioned eg $x^32 - 18x^2y + y5x^2 - 45xy^2$		M1A0
	$2x^3 + -18x^2y + 5x^2y + -45xy^2$ has 4 correct terms but needs further simplification to score A1		M1A0
	Terms must be processed eg do not allow $x^2 \times 2x$ for $2x^3$		

Q6. (2023)

Q	Answer	Mark	Comments
25	$\frac{(x-5)(x+2)}{(x-2)(x+2)}$ 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