

1. Simplify.

(i) $4a + 3a$

----- [1]

(ii) $5a \times a$

----- [1]



2(a). Amin is attempting to solve the following equation.

$$(x + 1)(x + 4) = (x - 2)(x - 3)$$

His **incorrect** solution is shown below.

$$(x + 1)(x + 4) = (x - 2)(x - 3)$$

Step 1 $x^2 + 4x + x + 4 = x^2 - 3x - 2x + 6$

Step 2 $x^2 + 5x + 4 = x^2 - x + 6$

Step 3 $5x + 4 = -x + 6$

Step 4 $6x + 4 = 6$

Step 5 $6x = 2$

Step 6 $x = \frac{1}{3}$

Identify the step in which Amin made his first error and explain why this step is incorrect.

----- [2]



(b). Write out a correct solution to the equation.

[2]

3. Show that $4(a + 3) - 3(a - 2) = a + 18$.

[2]

4(a). Simplify.

(i) $5j - 3j + 8j$

(i) _____

[1]

(ii) $3r - 2s - 5r + 6s$

(ii) _____

[2]

(b). Expand.

$$5(x + 4)$$

[1]

5. Simplify fully.

(i) $6 \times b \times 3$

(i) _____ [1]

(ii) $\frac{24x}{3}$

(ii) _____ [1]

(iii) $4 \times m \times m$

(iii) _____ [1]

(iv) $7y + 3y - y$

(iv) ----- [1]

6. Multiply out.

$$4(3x - 1)$$

[1]

7. Simplify fully.

$$4b + 5c - 2b + 9c$$

[2]

8. Simplify fully.

(i) $5a \times 3b$

(i) ----- [1]

(ii) $4a - 2b + a + 5b$

(ii) ----- [2]

9. Simplify as much as possible.

$4a + 5a$

----- [1]

10. Draw a line from each expression on the left to its equivalent expression on the right.

$4d - d$	$4d$
$4d \times d$	$3d$
$2d \times 2$	$5d$
$8d \div 2d$	$4d^2$
	4

11(a) Tim's maths homework is about factorising.

[4]

Complete this question.

$$18x + 27 = 9 (\text{-----} + 3)$$

(b). $\text{-----} y - 8 = 4 (3y - \text{-----})$

[1]

[2]

12. Simplify fully.

(i) $5 \times a \times 4$

(i) [1]

(ii) $\frac{15p}{3p}$

(ii) [1]

(iii) $4x + 3y - 3x + y$

(iii) [2]



13(a) Simplify.

$$7j - 6k - 5j + 4k$$

----- [2]



(b). Multiply out.

$$3(2x + 4)$$

----- [1]

14(a) Simplify fully.

(i) $7 \times y \times 9$

(i) ----- [1]

(ii) $\frac{10t}{2t}$

(ii) ----- [1]

(iii) $a + 6b - 4a + 2b$

(iii) ----- [2]

(b). Multiply out.

$$4(3x + 5)$$

----- [1]



15. Simplify fully.

(i) $p + 7p - 5p$

(i) _____ [1]

(ii) $3x + 4y - 4 + 5x - y$

(ii) _____ [2]



16. Simplify the following expressions.

(i) $a + 4a - 2a$

(i) [1]

(ii) $3c - 5d + 2c - 2d$

(ii) [2]

(iii) $b^5 \times b^3$

(iii) [1]

17(a)

. Simplify.

$$7t - 6u + 5t - 4u$$

----- [2]

(b). Factorise.

$$5v + 20w$$

----- [1]

18.



Multiply out.

$$3x(x + 2y)$$

----- [2]



19.

Factorise.

(i) $x^2 - xy$

----- [1]

(ii) $x^2 + 8x + 12$

----- [2]



20(a)

. Expand and simplify.

$$5(x - 2) - 2(x - 4)$$

----- [2]



(b). Factorise fully.

$$10x^2 + 6x$$

----- [2]



(c). Simplify.

$$(x^5)^2$$

----- [1]



21.

Simplify.

(i) $2p + 5p - 3p$

(i) [1]

(ii) $6j + 3k - j - 5k$

(ii) [2]



22(a)

. Simplify fully.

(i) $4(c + 2d) + 3(3c - 5d)$

----- [3]

(ii) $4a \times 5b$

(ii) ----- [1]



(b). Factorise fully.

(i) $6g + 8h$

(i) ----- [1]

(ii) $5x^2 - 15x$

(ii) ----- [2]



23.

Factorise.

$$x^2 - 43^2$$

----- [1]

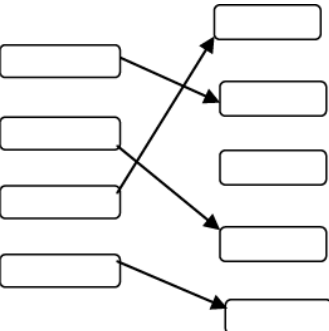
END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1		i	$7a$	1	0 for $7 \times a$ etc Examiner's Comments Was usually correct.	Condone capitals, $a7$ etc throughout question
		ii	$5a^2$	1	0 for $5 \times a^2$ etc Examiner's Comments Proved more difficult. Common errors included $5a$ and $6a$.	
			Total	1		
2	a		The first error is in step 2 $-3x - 2x = -5x$, not $-x$ as given	2	B1 for identifying step 2 B1 for explaining the error	
	b		$[x^2 + 4x + x + 4 = x^2 - 3x - 2x + 6]$ $x^2 + 5x + 4 = x^2 - 5x + 6$ $5x + 4 = -5x + 6$ $10x + 4 = 6$ $10x = 2$ $x = \frac{1}{5}$	2	M1 for an attempt to correct the solution in line with their answer to (a)	
			Total	4		
3			Correct reasoning	2	M1 for $4a + 12 - 3a \pm 6$	
			Total	2		
4	a	i	$10j$	1		

Question			Answer/Indicative content	Marks	Part marks and guidance	
		ii	$-2r + 4s$	2	M1 for $-2r$ or $4s$ in answer	<p>$4s + -2r$ scores M1</p> <p>Examiner's Comments</p> <p>This question tested algebra and was tackled well by most candidates. The majority of candidates answered (i) correctly with a few failing to fully simplify their answer leaving responses such as $2j + 8j$, some just added all the values and $16j$ was seen quite often. Most scored at least 1 mark in (ii) with about half getting full marks. The most common mistakes involved confusion about signs with many getting $8r$ and $8s$ by ignoring the negative signs and adding instead of subtracting.</p>
	b		$5x + 20$	1		<p>Examiner's Comments</p> <p>The expansion was also completed successfully in a large majority of cases. Among common incorrect responses were $5x + 4$ and $25x$ showing that an incorrect attempt had been made to collect terms.</p>
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
5		i	$18b$	1	Mark final answer	<p>In this part, penalise first occurrence of poor notation e.g. $18 \times b$, $b18$ etc</p> <p>Examiner's Comments</p> <p>This question was very well answered, almost all candidates were able to simplify the expressions in part (a) using the correct algebraic conventions. Of those that made errors it was mainly down to a lack of care, for example, $9b$ in part (i), 8 in part (ii). The equations were answered well in part (b). There were a few candidates who made the predictable error of an answer of 4 in part (b)(i) and a few were unable to cope with the directed numbers in part (b)(iii) when doing $-23 - 5$, but they often gained a method mark for showing this step in their working.</p>
		ii	$8x$	1	Mark final answer	<p>Examiner's Comments</p> <p>Of those that made errors it was mainly down to a lack of care, for example, 8 in (ii).</p>
		iii	$4m^2$	1	Mark final answer	
		iv	$9y$	1	Mark final answer	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
6			$12x - 4$	1	Mark final answer	<u>Examiner's Comments</u> The majority were able to correctly expand the brackets but then a number went on to try to further simplify $12x - 4$ and answers such as 8 or $8x$ were given.
			Total	1		
7			$2b + 14c$ as final answer	2	B1 for one term correct in final answer or for correct answer seen in working then spoilt <u>Examiner's Comments</u> This was reasonably well answered, with the majority of candidates attempting to deal with the b and the c terms separately. Common errors included $2b - 14c$, $6b \pm 4c$ and $16bc$.	
			Total	2		
8		i	$15ab$	1	Must be simplified	Not $15 \times a \times b$
		ii	$5a + 3b$	2	B1 for $5a$ or for $3b$ <u>Examiner's Comments</u> An answer of $8ab$ was quite common in part (i), while in part (ii) $3a+7b$ and $5a \pm kb$ with k not equal to 3 were often seen.	Condone $a5$, $5 \times a$, $5A$ etc
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
9			$9a$	1	0 for $9 \times a$ etc Examiner's Comments Most candidates scored the mark, although occasionally an answer of $9a^2$ was seen.	Condone capitals, $a9$ etc
			Total	1		
10				4	B1 for each correct match Examiner's Comments More able candidates usually scored all 4 marks and were able to match expressions correctly. Others typically had problems in matching $4d \times d$ with $4d^2$ and $8d \div 2d$ with 4.	
			Total	4		
11	a		$2x$	1	Examiner's Comments Only the more able candidates scored well on this question. A common error in part (a) was to write 2 and omit the x .	
	b		12 and 2	1 + 1	Examiner's Comments It was more common to award one mark for 12 in the first expression than for the 2 in the bracket. A number omitted this question.	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
12		i	$20a$	1		Not for $20 \times a$ or $a20$ etc
		ii	5	1		
		iii	$x + 4y$ final answer	2	<p>Condone 1x used B1 for $[1]x + ky$ or $kx + 4y$ ($k \neq 0$) as answer Or for correct answer shown then spoilt</p> <p>Examiner's Comments</p> <p>This question tested a range of simple algebraic simplification and substitution producing a range of answers. Part (i) was answered very well, a common incorrect answer was $9a$. Most gave the incorrect answer $5p$ to part (ii) and did not realise that the p's cancelled in the division. Part (iii) was answered well by many but errors with the directed terms led to incorrect collection of one of the terms for others.</p>	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
13	a		$2j - 2k$ oe cao	2	<p>B1 $2j$ or $-2k$ in final answer</p> <p>Examiner's Comments</p> <p>Most candidates attempted this with many gaining 1 mark for $2j$ but very few got $-2k$ or even $2k$. Instead $10k$ or $-10k$ was frequently given.</p>	$2j + -2k$ scores B1
	b		$6x + 12$ cao	1	<p>Examiner's Comments</p> <p>Many candidates were able to give the correct answer but the weaker candidates often gave a numerical answer, 18 being a common error.</p>	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
14	a	i	$63y$	1	Mark final answer	Throughout part (a) penalise the first occurrence only of poor notation e.g. $63 \times y$
		ii	5	1	Mark final answer	
		iii	$8b - 3a$	2	Mark final answer B1 for $kb - 3a +$ or $8b - ka$ as answer or $8b - 3a$ seen then spoilt Examiner's Comments This question tested various algebraic skills including simplifying expressions and solving equations. This was not answered as well as expected. The correct answer $63y$ was given by many candidates in the first part but there were a range of errors, including $63 \times y$ and $16y$. The second part was answered poorly with the majority giving an answer of $5t$ for the division. A few did recognise the common factor of t in the numerator and denominator of the expression to give an answer of 5. In the third part, many gained partial credit for either correctly collecting the terms in a or b , but a minority earned both marks, with the most common error being not to deal correctly with the negative term in a correctly.	Allow any k Allow $8b\ 3a$ with no signs B1

Question			Answer/Indicative content	Marks	Part marks and guidance	
	b		$12x + 20$	1	Mark final answer Examiner's Comments This had a mixed response. Straightforward for many, but for others the temptation of incorrectly simplifying the expression further after a correct expansion of the brackets was too great and answers such as 32 or $32x$ were often seen.	
			Total	5		
15		i	$3p$	1	mark final answer	Accept $3 \times p$ or $p \times 3$ Condone $p3$
		ii	$8x + 3y - 4$	2	mark final answer M1 for $[+]8x$ seen or $[+]3y$ seen Examiner's Comments Most candidates attempted to simplify the algebraic expressions, with varying degrees of success. There were many correct answers in part (a)(i), although a small number did not fully simplify the expression and gave an answer of $8p - 5p$. There were few correct answers in part (a)(ii), although most obtained a part mark for a partially correct simplification, usually for finding $8x$.	Accept $8 \times x$ or $x \times 8$, etc Condone $x8$ or $y3$
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
16		i	$3a$	1		
		ii	$5c - 7d$	2	B1 for $5c$ or $-7d$	
		iii	b^8	1	<p>Examiner's Comments</p> <p>The parts of this algebra question were answered with varying degrees of success. In (i) the answer was mainly correct, the most common error was incomplete processing and giving the answer as $5a - 2a$. (ii) Most candidates scored 1 mark for $5c$, but could not correctly deal with "d", common incorrect answers were, $5c + 3d$, $5c - 3d$, $c + 3d$ and $5c + 7d$. In (iii) many correct answers were seen, with the common errors being $8b$ or b^{15}.</p>	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
17	a		$12t - 10u$ or $2(6t - 5u)$ cao	2	<div> <div>B1 for $12t$ or $-10u$ in final answer</div> <div>$12t + -10u$ scores B1</div> </div> <p>Examiner's Comments In part (a) many correct answers were seen, although it was common to see incorrect terms $10u$ or $2u$ in the answer. Most scored 1 mark for correctly obtaining $12t$. Part (b) was less well answered. Several candidates did not take the factor of 5 out of the second term and gave responses of $5(v + 20w)$. In part (c) fewer correct answers were seen. Those that had some understanding recognised that the solution required a factorisation leading to an expression in the form $(x + a)(x + b)$; many of these then went on to give the correct $(x + 3)(x + 7)$, but failed to give the correct solutions (answers of 3 and 7 often followed). Another common error was taking out a single factor from 2 or more terms.</p>	
	b		$5(v + 4w)$	1	<div> <div></div> <div>Condone omission of final bracket</div> </div>	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
18			$3x^2 + 6xy$ final answer	2	<div> <div>B1 for $3x^2$ or $6xy$ seen</div> <div> Condone $6yx$ Do not accept eg $6 \times x \times y$ </div> </div> <p>Examiner's Comments Part (a) was well done. A common error was $3x^2 + 5xy$ or, less often, giving the $6xy$ term as just $6y$. Some did expand the brackets correctly, but then went on to try and combine their terms. Although correct answers were very common in (b)(i), algebraic methods were rarely seen. Common errors were an answer of 21 and some simple errors in dividing by 7 were made. In (b)(ii) full marks were not often awarded and it was difficult to award M marks as working was rarely algebraic; clear methods were not seen very often. Candidates often showed that $9 + 2 = 11$, but not in $\frac{1}{2}$. Others relation to multiplied by 3 first, but often a term was missed out (e.g. giving $x - 2 = 27$). Many problems arose from attempting a trial-and-improvement technique, with a common incorrect answer of 11.</p>	
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance		
19		i	$x(x - y)$ final answer	1		Condone omission of final bracket Condone $[1]x([1]x - [1]y)$	
		ii	$(x + 6)(x + 2)$ final answer	2	<p>M1 for $(x + a)(x + b)$ where $ab = \pm 12$ or $a + b = \pm 8$ or for $x(x + 6) + 2(x + 6)$ seen or $x(x + 2) + 6(x + 2)$ seen</p>	<p>a, b integers For 2 marks, condone solutions after correct factors For 2 marks or M1, condone omission of final bracket</p>	
			Total	3			

Question			Answer/Indicative content	Marks	Part marks and guidance	
20	a		$3x - 2$ final answer	2	<div> M1 for $5x - 10$ or $-2x + 8$ or B1 for $3x + j$ or $kx - 2$ ($k \neq 0$) final answer </div> <div> $3x + -2$ scores 1 mark j can be 0 </div>	
					<p>Examiner's Comment Some correct responses were seen to this part. Many candidates correctly expanded $5(x - 2)$ to score 1 mark, but did not always deal well with the second bracket, sometimes forgetting to multiply out and often being unable to deal with the minus sign. Often they had problems collecting the terms. Frequent wrong answers were $3x - 18$ and $7x$.....</p>	

Question			Answer/Indicative content	Marks	Part marks and guidance	
	b		$2x(5x + 3)$	2	<div> <div>B1 for $2(5x^2 + 3x)$ or $x(10x + 6)$</div> <div> Examiner's Comment This part was a challenge to many. Some partially factorised the expression; others extracted x as a factor yet still left x in the second term in the bracket with, for example $x(10x + 6x)$. A number of candidates tried to factorise the quadratic into two brackets and some added the terms together to make $16x^2$. $106x$ was another error. </div> </div>	
	c		x^{10}	1	<div> <div>Not, $x \times x \times \dots$</div> <div> Examiner's Comment In this part, x^7 and x^{25} were often given, or just 10 rather than x^{10}. </div> </div>	
			Total	5		

Question			Answer/Indicative content	Marks	Part marks and guidance	
21		i	$4p$	1		
		ii	$5j - 2k$	2	B1 for $5j$ or $- 2k$ in final answer	
					<u>Examiner's Comments</u> Part (a) was generally done well, however a small number of candidates did not fully simplify, giving their answer as $7p - 3p$. The most common error was with the negatives in part (a)(ii).	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance		
22	a	i	$13c - 7d$ final answer	3	<p>B2 for one term correct in final answer or M1 for $[4(c + 2d)] = 4c + 8d$ seen or $[3(3c - 5d)] = 9c - 15d$ seen</p>	$13c + -7d$ scores B2 only	
		ii	$20ab$ final answer	1		Accept $20ba$	
	b	i	$2(3g + 4h)$ final answer	1		Condone omission of final bracket	
		ii	$5x(x - 3)$ final answer	2	<p>M1 for $5(x^2 - 3x)$ or $x(5x - 15)$ or $5x(x + 3)$</p> <p><u>Examiner's Comments</u></p> <p>In part (a) candidates who were able to expand the brackets correctly in part (i) often reached a final answer with at least one term correct, $13c$ was seen more often than $-7d$. Some gave $+7d$ and others added to give $23d$. Some did not simplify but gained a mark usually for $4c + 8d$. Others attempted to combine the two given brackets and gave answers such as $7(4c - 3d)$. Errors in multiplying out the brackets arose from incorrectly dealing with the 2nd term in a bracket such</p>	Condone omission of final bracket	

Question			Answer/Indicative content	Marks	Part marks and guidance	
					as giving $2d$ or $6d$ instead of $8d$. Part (ii) was usually answered correctly. The most common incorrect answer was $9ab$, with other errors of $4a5b$ and $25ab$ sometimes seen. Many candidates did not understand the term 'factorise' in part (b) and answers such as $14gh$ or $6g8h$ in part (i) were common. Some who understood that brackets were required gave answers such as $6(g + 8h)$, $6(g + 2h)$, $(3g + 3g) + (4h + 4h)$. Again, many candidates did not understand what was required in part (ii) with an error of $25x - 15x = 10x$ commonly seen. A few that knew the method gained full marks, but correct partial factorisation was more common. Errors in factorisation attempts gave answers of $5x(x - 3x)$ or $x(5x - 15x)$.	
			Total	7		
23			$(x - 43)(x + 43)$ final answer	1	Condone omission of final bracket	
			Total	1		