

1. (a) Simplify

(i)  $c + c + c + c$

.....

(ii)  $p \times p \times p \times p$

.....

(iii)  $3g + 5g$

.....

(iv)  $2r \times 5p$

.....

(4)

(b) Expand

$5(2y - 3)$

.....

(1)

(Total 5 marks)

2. (a) Work out the value of  $3p + 4q$  when  $p = 5$  and  $q = -2$

.....

(2)

(b) Given that  $y = 4x - 3$ , work out the value of  $x$  when  $y = 11$

$x = \dots\dots\dots$

(3)

(c) Multiply out  $7(n - 3)$

.....

(1)  
(Total 6 marks)

3. (a) Simplify  $4x + 7y + 2x - 3y$

.....

(2)

(b) Simplify  $2pq + pq$

.....

(1)  
(Total 3 marks)

4. The table shows some expressions.

|            |          |                |           |          |
|------------|----------|----------------|-----------|----------|
| $2(y + y)$ | $2y + y$ | $2y \times 2y$ | $2y + 2y$ | $2 + 2y$ |
|            |          |                |           |          |

**Two** of the expressions **always** have the same value as  $4y$ .

Tick (✓) the boxes underneath the **two** expressions.

(Total 2 marks)

5. (a) Simplify  $m + m + m + m$

..... (1)

(b) Simplify  $p \times q \times 4$

..... (1)

(c) Expand  $5(3x - 2)$

..... (1)

(d) Expand  $3y(y + 4)$

..... (2)  
(Total 5 marks)

6. (a) Simplify

$$2x \times y \times 3$$

..... (1)

(b) Simplify

$$5x + 3y - 2x + y$$

..... (2)

(c) Multiply out

$$5(3x + 7)$$

.....

(1)  
(Total 4 marks)

7. (a) Simplify

(i)  $3e + 2e - e$

.....

(ii)  $p \times q \times 5$

.....

(2)

(b) Multiply out  $7(2x - 1)$

.....

(1)  
(Total 3 marks)

8. (a) Simplify

$$5m + 7m$$

.....

(1)

(b) Multiply out

$$3(2p - 5)$$

.....

(1)  
(Total 2 marks)

9. (a) Simplify  $5m + 3m - 2m$

..... (1)

(b) Simplify  $p + 7q + 3p - 2q$

..... (2)

(c) Multiply out  $3(t - 4)$

..... (1)

(d) Simplify  $4a \times 3b$

(1)  
(Total 5 marks)

10. Expand  $3(t - 4)$

..... (Total 1 mark)

11. (a) Simplify  $4e \times 3f$

..... (1)

(b) Expand  $4(2x + 5)$

..... (1)

(c) Simplify  $4r - 2t + 3r - 7t$

..... (2)  
(Total 4 marks)

12. Expand and simplify  $(x + 5)(x + 2)$

..... (Total 2 marks)

1. (a) (i)  $4c$  4  
*Bl oe*
- (ii)  $p^4$   
*Bl cao*
- (iii)  $8g$   
*Bl oe*
- (iv)  $10pr$   
 OR  
 $10rp$   
*Bl*
- (b)  $10y - 15$  1  
*Bl cao Accept  $10y + - 15$*
- [5]**
2. (a) 7 2  
 $3 \times 5 + 4 - 2$   
*M1 for  $3 \times 5 + 4 \times -2$*   
*A1 cao*
- (b)  $3\frac{1}{2}$  oe 3  
 $4x - 3 = 11$   
 $4x = 11 + 3$   
*M1 for  $4x - 3 = 11$*   
*M1 for  $4x = 11 + 3$*   
*A1 for  $3\frac{1}{2}$  oe*
- (c)  $7n - 21$  1  
*Bl cao*
- [6]**
3. (a)  $6x + 4y$  2  
*Bl for either  $6x$  or  $4y$*   
*Bl cao*

|    |   |  |   |            |
|----|---|--|---|------------|
|    | (b) $3pq$                                       | <i>B1 cao (not <math>3 \times p \times 2</math>)</i>   | 1 |            |
|    |   |  |   | <b>[3]</b> |
| 4. | $2(y + y)$<br>$2y + 2y$                         |  | 2 |            |
|    | See diagram                                     | <i>B1 for <math>2(y + y)</math><br/>B1 for <math>2y + 2y</math><br/>(Deduct B1 for each additional tick (<math>&gt; 2</math>) to min 0)</i>  |   | <b>[2]</b> |
| 5. | (a) $4m$  | <i>B1 for <math>4m</math> oe</i>   | 1 |            |
|    | (b) $4pq$                                       | <i>B1 for <math>4pq</math> or <math>4qp</math> or <math>p4q</math> oe</i>  | 1 |            |
|    | (c) $5 \times 3x - 5 \times 2$<br>$15x - 10$    | <i>B1 for <math>15x - 10</math> cao</i>  | 1 |            |
|    | (d) $3y \times y + 3y \times 4$<br>$3y^2 + 12y$ | <i>M1 for <math>3y \times y + 3y \times 4</math> or <math>3y^2 + a</math> or <math>3y^2 + ay</math> or <math>b + 12y</math> or <math>by^2 + 12y</math> where <math>a, b</math> are integers, and can be zero<br/>A1 for <math>3y^2 + 12y</math> or <math>3 \times y^2 + 12 \times y</math></i> | 2 | <b>[5]</b> |
| 6. | (a) $6xy$                                       | <i>B1 any order, no <math>\times</math> sign</i>   | 1 |            |
|    | (b) $3x + 4y$                                   | <i>B2 (B1 for either <math>3x</math> or <math>4y</math> seen) (cannot isw)</i>   | 2 |            |
|    | (c) $15x + 35$                                  | <i>B1 cao (cannot isw)</i>   | 1 | <b>[4]</b> |



7. (a) (i)  $4e$  2  
*BI for 4e or e4*
- (ii)  $5pq$   
*BI*
- (b)  $14x - 7$  1  
*BI*
- [3]**
8. (a)  $12m$  1  
*BI*
- (b)  $6p - 15$  1  
*BI*
- [2]**
9. (a)  $6m$  1  
*BI for 6m*
- (b)  $4p + 5q$  2  
*B2 (BI for 4p or 5 q seen)*
- (c)  $3t - 12$  1  
*BI*
- (d)  $12ab$  1  
*BI*
- [5]**
10.  $3t - 12$  1  
*BI For 3t - 12 or 3 × t - 3 × 4*
- [1]**

11. (a)  $12ef$  1  
*B1*
- (b)  $8x + 20$  1  
*B1*
- (c)  $7r - 9t$  2  
*B2 for  $7r - 9t$*   
*(B1 for  $7r$  or  $-9t$ )*

[4]

12.  $x^2 + 5x + 2x + 10$  2  
 $= x^2 + 7x + 10$

*B2 cao**(B1 for  $x^2$ ,  $5x$ ,  $2x$  and  $10$  seen irrespective of the sign of each or 3 out of no more than 4 terms with correct signs)**Because all of the terms of this expansion are positive terms, we do not need to see the “+” sign to give credit. Sight of 3 from  $x^2$ ,  $5x$ ,  $2x$ ,  $10$  is enough for the M1.**Some are, however inserting their own negative signs, so watch out.**Note: Sight of  $x^2 + 7x$  without working gets B0*

[2]

- In part (a), most success was achieved on (iii) ( $3g + 5g$ ), closely followed by (i) ( $c + c + c + c$ ), for which  $c^4$  also had considerable support. The other two parts proved more difficult.  $4p$  and  $4^p$  were often seen in part (ii) while  $7rp$  and  $2r5p$  were popular in part (iv). Part (b) was poorly answered;  $7y - 3$  and  $10y - 3$ , sometimes “simplified” to  $7y$ , were the most common wrong answers.
- It was pleasing to see the majority of candidates showing their working in part (a) with many gaining a method mark for ‘ $3 \times 5$ ’ and ‘ $4 \times -2$ ’. Unfortunately ‘ $15 + - 8$ ’ was often incorrectly calculated and ‘23’, ‘-23’ and ‘-7’ were common responses. Some candidates wrote ‘ $4(-2) = 2$ ’ and some used  $q = 2$  instead of  $q = -2$ . In part (b) many candidates correctly substituted  $y = 11$  but it was common to see ‘ $11 = 4x - 3$ ’ followed by ‘ $11 - 3 = 4x$ ’. Where candidates did go on to get ‘ $14 \div 4$ ’, this was often evaluated as 3.2. Candidates are to be encouraged to show all working as they were not penalised in this part for giving an answer of 3.2 if they had clearly shown ‘ $x = \frac{14}{4}$ ’. Some candidates used trial and improvement to solve the equation without any reference to algebraic techniques. Part (c) was answered quite well although some candidates forgot to multiply the second term of the bracket by 7.

3. In part (a) many candidates were unable to combine like terms. They introduced indices where there weren't any, or made errors with minus signs. Most candidates answered part (b) correctly, though  $2p^2q$  and  $2p^2q^2$  were common incorrect answers.

#### 4. Specification A

##### Foundation Tier

The modal mark on this question was 1 with 71% of candidates gaining this mark. Only 9% were able to obtain both marks.

##### Intermediate Tier

Most candidates were able to gain at least one mark.  $2y + 2y$  was the correct expression most commonly identified. The most popular wrong answers were  $2 + 2y$  and  $2y \times 2y$ .

##### Specification B

Many candidates were able to find an expression equivalent to  $4y$  and gain at least one mark.

5. Even basic algebra was a weakness on this paper. Only about half the candidates were able to simplify the expression in parts (a) and (b), with the performance far worse in parts (c) and (d). In part (a) candidates were just guessing, giving answers such as  $m^4$  and  $4^m$ , and in (b)  $pq^4$  and incomplete expressions such as  $pq \times 4$  or similar.

In (c) many did not know what to do with the 5. Many added it, others doing a partial expansion leading to  $15x$ ,  $15x - 2$  or  $15x + 5 - 2$

In part (d) few gave any reasonable answer, with a plethora of terms associated with 3,  $y$  and 4, but with little recognition of what was needed when multiplying. In some cases correct answers were spoilt by incorrect and unnecessary further simplification, such as  $15y^2$ .

6. Most candidates scored no more than one mark on this question. It was clear that some centres had done little to no work on algebra or the candidates just could not cope with this topic.
- (a) Most did not simplify fully, with  $6x \times y$  and  $2x \times 3y$  as the most common incorrect answers.
- (b) A few candidates managed to score one mark by obtaining  $3x$  or  $4y$  and then missing out the + sign or by giving the answer  $7x + 4y$ .
- (c) Hardly any candidates scored here with  $50x$  being a very popular answer for those who tried to attempt it.

7. Algebra continues to be the Achilles heel for Foundation candidates with virtually all candidates scoring low marks on this question. Partially simplified answers were common in (a).  $5e$  was frequently seen as the answer to (i) and a multiplication sign was often in the answer to (ii) scoring no marks.  
There were very muddled responses to multiplying out  $7(2x - 1)$ . The few that realised that they had to multiply by 5 tended to multiply only the first term in the bracket by 7 reaching an answer of  $14x - 1$ .
8. (a) It was pleasing to see that over  $\frac{3}{4}$  of the candidates were able to correctly simplify an algebraic expression. The most common incorrect response was  $12m^2$ .  
(b) This proved very challenging to even the most able students at this level with only 8% of the candidates scoring the available mark.
9. Most candidates had some success with the first two parts and simplifying  $4a \times 3b$ . However, multiplying out  $3(t - 4)$  proved impossible for over 90% of the candidates. Most of these had no idea and rarely ended up with two terms.
10. This question was correctly answered by half of the candidature.  $3t - 4$  was the most common error.
11. Candidates at this tier of entry often struggle with manipulative algebra and this was true again with these questions. In part (a) 45% of candidates obtained the correct answer whilst in part (b) only 30% of candidates could expand the bracket correctly and in part (c) only 15% obtained the fully simplified answer with a further 35% gaining 1 mark for  $7r$  or  $-9t$ .
12. This question was not answered well; a great number of candidates demonstrating no knowledge of the expansion of two brackets.  $x + 5$  and  $x + 2$  was often simplified to  $5x$  and  $2x$  resulting in an answer of  $7x$ . Of those candidates who did use correct methods of expansion  $x^2 + 7x + 7$  was a common error.