1. (a) Simplify

(i) $3g + 5g$

.....

(ii) $2r \times 5p$

.....

(2)

(b) Expand $5(2y - 3)$

.....

(1)

(c) Expand and simplify

$2(3x + 4) - 3(4x - 5)$

.....

(2)
(Total 5 marks)

2. (a) Factorise $3t - 12$

……

(1)

(b) Expand and simplify $3(2x - 1) - 2(2x - 3)$

……

(2)
(Total 3 marks)

3. (a) Simplify

(i) $p^2 \times p^7$

……

(ii) $x^8 \div x^3$

……

(iii) $\dfrac{y^4 \times y^3}{y^5}$

……

(3)

(b) Expand $t(3t^2 + 4)$

……

(2)
(Total 5 marks)

4. (a) Expand and simplify

$$3(2x - 1) - 2(2x - 3)$$

……

(2)

(b) Factorise

$$y^2 + y$$

……

(1)
(Total 3 marks)

5. (a) Expand $t(t - 2)$

.....

(1)

(b) Factorise $3y - 12$

.....

(1)
(Total 2 marks)

6. (a) Simplify

(i) $3a + 4b - 2a - b$

.....

(ii) $5x^2 + 2x - 3x^2 - x$

.....

(4)

(b) Expand the brackets

(i) $4(2x - 3)$

.....

(ii) $p(q - p^2)$

.....

(2)

(c) Expand and simplify $5(3p + 2) – 2(5p – 3)$

.....

(2)
(Total 8 marks)

7. (a) Simplify

(i) $\frac{x^6}{x^2}$

.....

(ii) $(y^4)^3$

.....

(2)

(b) Expand and simplify $(t + 4)(t – 2)$

.....

(2)

(c) Write down the integer values of x that satisfy the inequality

$$–2 \leq x < 4$$

.....

(2)
(Total 6 marks)

8. (a) Expand the brackets $p(q – p^2)$

.....

(1)

(b) Expand and simplify $5(3p + 2) – 2(5p – 3)$

.....

(2)
(Total 3 marks)

9. (a) Factorise $p^2 + 6p$

…….

(2)

(b) Expand and simplify $(x + 7)(x – 4)$

…….

(2)
(Total 4 marks)

10. (a) Expand and simplify $(x + 7)(x – 4)$

…….

(2)

(b) Expand $y(y^3 + 2y)$

…….

(2)

(c) Factorise $p^2 + 6p$

…….

(2)

(d) Factorise completely $6x^2 - 9xy$

…….

(2)
(Total 8 marks)

11. (a) Expand and simplify

$(x - y)^2$

.....

(2)

(b) Rearrange $a(q - c) = d$ to make q the subject.

q = ...

(3)
(Total 5 marks)

12. (a) Simplify

(i) $x^4 \times x^5$

……

(ii) $\frac{p^8}{p^3}$

……

(iii) $3s^2t^3 \times 4s^4t^2$

……

(iv) $(q^3)^4$

……

(5)

(b) Expand $3(2g - 1)$

……

(1)

(c) Expand and simplify $(x + 2)(x + 3)$

……

(2)

(Total 8 marks)

13. (a) Solve $\frac{y}{4} = 5$

$y =$ .....

(1)

(b) Factorise $x^2 + 4x$

.....

(1)

(c) Simplify

(i) $m^2 \times m^5$

.....

(ii) $t^7 \div t^3$

.....

(2)

(d) Expand and simplify $(x + 5)(x + 3)$

.....

(2)
(Total 6 marks)

14. (a) Simplify $4p + 5q + p - 3q$

.....

(2)

(b) Expand $y(y - 5)$

.....

(1)

(c) Expand and simplify $2(3m + 4) + 3(m - 5)$

.....

(2)
(Total 5 marks)

15. (a) Simplify $p^7 \times p^2$

.....

(1)

(b) Simplify $\frac{q^8}{q^3}$

.....

(1)

(c) Simplify $(t^3)^4$

.....

(1)

(d) Expand and simplify $2(3m + 4) + 3(m - 5)$

.....

(2)

(Total 5 marks)

16. (a) Simplify fully $4a + 5b - 2a + b$

.....

(2)

(b) Factorise $x^2 - 6x$

.....

(2)

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

.....

(2)

(d) Factorise completely $12xy + 4x^2$

.....

(2)

(Total 8 marks)

17. (a) Expand and simplify $(x + 3)(x - 4)$

.....

(2)

(b) Factorise $x^2 + 7x + 10$

.....

(2)

(c) $p = 3t + 4(q - t)$

Find the value of q when $p = 6$ and $t = 5$

$q =$ .....

(3)
(Total 7 marks)

18. (a) Factorise $x^2 - 5x$

.....

(2)

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

.....

(1)
(Total 3 marks)

19. (a) Factorise $x^2 - 5x$

.....

(2)

(b) Factorise completely $3a^2 - 6a$

.....

(2)

(c) Make q the subject of the formula $P = 2q + 10$

$q =$ .....

(2)

(d) Expand and simplify $(y + 3)(y – 4)$

.....

(2)

(Total 8 marks)

20. (a) Simplify $4p \times 5q$

.....

(1)

(b) Simplify $d \times d \times d \times d$

.....

(1)

(c) Expand $4(3a – 7)$

.....

(2)

(d) Expand and simplify $2(2n + 3) + 3(n + 1)$

.....

(2)

(e) Simplify $t \times t^2$

.....

(1)

(f) Simplify $m^5 \div m^3$

.....

(1)
(Total 8 marks)

21. (a) Expand $x(3x - 5y)$

.....

(2)

(b) Factorise $x^2 - 36$

.....

(1)
(Total 3 marks)

22. (a) Simplify $4a + 3c - 2a + c$

.....

(1)

(b) $S = \frac{1}{2}at^2$

Find the value of S when $t = 3$ and $a = \frac{1}{4}$

$S =$ .....

(2)

(c) Factorise $x^2 - 5x$

.....

(2)

(d) Expand and simplify $(x + 3)(x + 4)$

.....

(2)

(e) Factorise $y^2 + 8y + 15$

.....

(2)
(Total 9 marks)

23. (a) Expand $4(x - 3)$

.....

(1)

(b) Solve $4t + 1 = 19$

$t =$ .....

(2)
(Total 3 marks)

24. (a) Expand and simplify $3(x + 4) + 5(2x + 1)$

.....

(2)

(b) Simplify $t^4 \times t^6$

.....

(1)

(c) Simplify $p^8 \div p^5$

.....

(1)

(d) Simplify $(x^4)^3$

.....

(1)

(Total 5 marks)

25. (a) Simplify $a \times a \times a$

.....

(1)

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

.....

(1)

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

.....

(2)

(d) Expand and simplify $2(x – 4) + 3(x + 2)$

.....

(2)

(e) Expand and simplify $(x + 4)(x – 3)$

.....

(2)
(Total 8 marks)

26. (a) Solve the inequality $5x + 12 > 2$

……

(2)

(b) Expand and simplify

$(x - 6)(x + 4)$

……

(2)
(Total 4 marks)

27. Expand and simplify

$2(3x + 4) - 3(4x - 5)$

.....

(Total 2 marks)

28. Expand $(x + 5)(x + 8)$

……

(Total 2 marks)

29. Expand and simplify

$(y + 5)(y + 3)$

.....

(Total 2 marks)

30. Multiply out

(i) $4(2x - 3)$

.....

(ii) $y(y + 8)$

.....

(Total 2 marks)

31. (a) Expand $y(y + 5)$

.....

(1)

(b) Factorise $10x - 6$

.....

(1)

(Total 2 marks)

32. Expand and simplify

$(x + 7)(x + 5)$

.....

(Total 2 marks)

33. Expand and simplify $(x – 9)(x + 4)$

.....

(Total 2 marks)

34. Expand and simplify $(x + 1)(x – 7)$

.....

(Total 2 marks)

35. Expand $5(2w – 3)$

(Total 1 mark)

36. (a) Expand $3(4x - 5)$

.....

(1)

(b) Factorise $5y + 40$

.....

(1)
(Total 2 marks)

37. (a) Solve the inequality $6x < 7 + 4x$

.....

(2)

(b) Expand and simplify $(y + 3)(y + 4)$

.....

(2)
(Total 4 marks)

38. (a) Simplify

(i) $x^4 \times x^5$

…….

(ii) $\frac{p^8}{p^3}$

…….

(2)

(b) Expand $3(2g - 1)$

…….

(1)
(Total 3 marks)

39. Expand and simplify fully

$(x + 4)(x + 7)$

$x^2 + 28$	$x^2 + 28x + 28$	$x^2 + 11x + 11$	$x^2 + 4x + 7x + 11$	$x^2 + 11x + 28$
☐	☐	☐	☐	☐
A	**B**	**C**	**D**	**E**

(Total 1 mark)

40. $(x + 2)(x - 4) =$

$x^2 + 2x - 8$	$x^2 + 6x - 8$	$x^2 + 2x - 2$	$x^2 + 2x + 2$	$x^2 - 2x - 8$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

41. Expand and simplify $(x - 2)(x + 1)$

.....

(Total 2 marks)

42. (a) Expand $c(d + 4)$

.....

(1)

(b) Expand and simplify $3(x + 5) + 2(x - 1)$

.....

(2)

(Total 3 marks)

43. (a) Factorise $5x + 10$

.....

(1)

(b) Expand and simplify $(x – 3)(x + 5)$

.....

(2)
(Total 3 marks)

44. Expand and simplify $(x + 4)(x – 3)$

.....

(Total 2 marks)

45. (a) Simplify fully $3x + 5y + 2x – 6y$

.....

(2)

(b) Simplify fully $\frac{2x}{4xy}$

.....

(2)

(c) Expand and simplify $\frac{1}{2}(2x-6)$

.....

(1)
(Total 5 marks)

46. $(x + 3)(x + 4) =$

$x^2 - 7x + 7$	$x^2 + 12$	$2x + 7$	$x^2 + 7x + 12$	$x^2 + 7x + 7$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

47. Expand $2(3x + 4)$

$6x + 4$	$5x + 6$	$14x$	$5x + 8$	$6x + 8$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

48. (a) Expand

$2(3c - 2)$

.....

(1)

(b) Factorise

$xy + 3x$

.....

(1)
(Total 2 marks)

49. (a) Simplify

$8e - 3f - e - 3f$

.....

(2)

(b) Expand

$2(3c - 2)$

.....

(1)

(c) Factorise

$xy + 3x$

.....

(1)

(Total 4 marks)

50. Expand and simplify $(x + 2)(x – 5)$

$x^2 – 10$	$x^2 – 3x – 3$	$x^2 – 3x – 10$	$x^2 + 3x – 10$	$x^2 + 7x – 10$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

51. (a) Expand and simplify $4(2x + 5) + 2(3x – 2)$

.....

(2)

(b) Expand and simplify $(x + 5)(x + 8)$

.....

(2)

(Total 4 marks)

52. Expand and simplify $3(2x + y) - (x - 2y)$

$5x + 5y$	$5x + y$	$6x^2 - 9xy + 6y^2$	$6x + 3y$	$5x + 3y$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

53. $(x + 3)(x + 5) =$

$2x + 15$	$2x + 8$	$x^2 + 15$	$x^2 + 8x + 15$	$x^2 + 8x + 8$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

54. (a) Expand and simplify $3(2x + 3) + 2(x + 1)$

.....

(2)

(b) Expand and simplify $(y - 3)(y + 4)$

.....

(2)

(Total 4 marks)

1. (a) (i) $8g$ 2

B1 oe

(ii) $10rp$

B1 for 10pr or 10 rp

(b) $10y - 15$ 1

B1 cao accept 10y – + 15

(c) $-6x + 23$ 2

$6x + 8 - 12x + 15$

M1 for 3 correct terms out of 4

A1 cao

[5]

2. (a) $3(t\text{-}4)$ 1

B1 cao

(b) $2x + 3$ 2

$6x - 3 - 4x + 6 = 2x + 3$

B1 for either 6x – 3 or – 4x +6

B1 cao

[3]

3. (a) (i) p^9 3

B1 cao

(ii) x^5

B1 cao

(iii) y^2

B1 cao

(b) $3t^3 + 4t$ 2

B2 for $3t^3 + 4t$

(B1 for either $3t^3$ or 4t seen or $3t^3 + 4t$ then an error)

[5]

4. (a) $2x + 3$ 2

$6x - 3 - 4x + 6 = 2x + 3$

B1 for either $6x - 3$ or $-4x + 6$
B1 cao

(b) $y(y + 1)$ 1

B1 cao

[3]

5. (a) $t^2 - 2t$ 1

B1 oe

(b) $3(y - 4)$ 1

B1 Accept $3 \times (y - 4)$ or $3(y - 4)$

[2]

6. (a) (i) $a + 3b$ 2

B2 for $a + 3b$ oe
(B1 for a or 1a or 3b)

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

B2 for $2x^2 + x$ oe
(B1 for $2x^2$ or x or 1x)

(b) (i) $8x - 12$ 1

B1 oe

(ii) $pq - p^3$ 1

B1 oe accept $p \times q - p \times p^2$ or better

(c) $5p + 16$ 2

$15p + 10 - 10p + 6$

B2 for $5p + 16$ oe
(B1 for any two terms correct from 15p, +10, –10p, +6)

[8]

7. (a) (i) x^4 1

B1 cao

(ii) y^{12} 1

B1 cao

(b) $t^2 + 2t - 8$ 2

B2 for fully correct
(B1 for 3 out of 4 terms from $t^2 + 4t - 2t - 8$)

(c) $-2, -1, 0, 1, 2, 3$ 2

B2 for fully correct
(B1 for –2, –1, 0, 1 , 2, 3 with either –2 omitted or 4 included, or both, or any five integers correct only and no incorrect integers)

[6]

8. (a) $pq - p^3$ 1

B1 oe accept $p \times q - p \times p^2$ or better

(b) $5p + 16$ 2

$15p + 10 - 10p + 6$

B2 for 5p + 16 oe
(B1 for any two terms correct from 15p, +10, –10p, +6

[3]

9. (a) $p(p + 6)$ 2

B2 for p(p + 6) or p × (p + 6)
(B1 for p(ap + b) where a, b are numbers or p + 6 seen on it's own, or part of an expression)

(b) $x^2 + 3x - 28$ 2

$x^2 - 4x + 7x - 28$

M1 for 4 terms correct ignoring signs (e.g. x^2, 4x, 7x, 28) or 3 terms with correct signs (e.g x^2, – 4x, 7x , – 28)
A1 cao

[4]

10. (a) $x^2 + 3x - 28$ 2

$x^2 - 4x + 7x - 28$

M1 for 4 terms correct ignoring signs (e.g. x^2, 4x, 7x, 28) or 3 terms with correct signs (e.g x^2, – 4x, 7x, – 28)
A1 cao

(b) $y^4 + 2y^2$ 2

B2 cao
B1 for y^4 or $2y^2$

(c) $p(p + 6)$ 2

B2 for p(p + 6) or p × (p + 6)
(B1 for p(ap + b) where a, b are numbers or p + 6 seen on it's own, or part of an expression)

(d) $3x(2x - 3y)$ 2

B2 (B1 for $3(2x^2 - 3xy)$ or x(6x – 9y) or 3x(…))

[8]

11. (a) $x^2 - xy - xy + y^2$
$x^2 - 2xy + y^2$ 2

M1 for 3 terms correct with sign, or 4 terms correct ignoring signs, or $x^2 - 2xy - y^2$
A1 cao

(b) $aq - ac = d$
$aq = ac + d$
$\frac{ac + d}{a}$ 3

B1 aq – ac
M1 for +ac or ÷ a both sides
A1 oe
OR
B2 $q - c = \frac{d}{a}$
B1 $q = \frac{d}{a} + c$, $q = d + a + c$ *oe*

[5]

12. (a) (i) x^9 1

B1 cao

(ii) p^5 1

B1 cao

(iii) $12\ s^6\ t^5$ 2

B2 cao

(B1 for two of 12, s^6, t^5 in a product)

(iv) q^{12} 1

B1 cao

(b) $6g - 3$ 1

B1 cao

(c) $x^2 + 3x + 2x + 6$ 2

$x^2 + 5x + 6$

B2 for $x^2 + 5x + 6$

(B1 for 3 out of 4 parts correct in working)

[8]

13. (a) 20 1

B1 cao

(b) $x(x + 4)$ 1

B1 cao

(c) (i) m^7 2

B1 cao

(ii) t^4

B1 cao

(d) $x^2 + 5x + 3x + 15 = x^2 + 8x + 15$ 2

M1 for 3 of 4 terms $x^2 + 5x + 3x + 15$, signs not needed
A1 for $x^2 + 8x + 15$

[6]

+6

B2 for $x^2 + 5x + 6$
(B1 for 3 out of 4 parts correct in working)

[8]

14. (a) $5p + 2q$ 2

B2
(B1 for 5p or ± 2q)

(b) $y^2 - 5y$ 1

B1

(c) $6m + 8 + 3m - 15$ 2
$= 9m - 7$

M1 for correct expansion of at least one bracket
A1 for 9m – 7

[5]

15. (a) p^9 1

B1 cao

(b) q^5 1

B1 cao

(c) t^{12} 1

B1 cao

(d) $6m + 8 + 3m - 15$ 2
$= 9m - 7$

M1 for correct expansion of at least one term
A1 for 9m – 7

[5]

16. (a) $4a - 2a + 5b + b = 2a + 6b$ 2

B2 cao
(B1 for 2a or 6b seen)

(b) $x(x - 6)$ 2

B2 cao
(B1 for x(ax + b) where a, b are numbers not equal to zero or x – 6 seen on its own, or part of an expression)

(c) $3x - 2x^3$ 2

B2 cao
(B1 for 3x or $2x^3$)

(d) $4x(3y + x)$ 2

B2 cao
(B1 for $2(6xy + 2x^2)$ or $4(3xy + x^2)$ or $x(12y + 4x)$ or $2x(6y + 2x)$ or $4x(\ \ ))$

[8]

17. (a) $x^2 - 4x + 3x - 12 = x^2 - x - 12$
$= x^2 - x - 12$ 2

M1 for exactly 4 terms correct ignoring signs (eg x^2, 4x, 3x, 12) or 3 correct terms out of 4 terms with correct signs (eg 3 out of 4 of x^2, –4x, +3x, –12)
A1 cao

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

B2 cao
(B1 for exactly one of (x + 2), (x + 5))

(c) $6 = 15 + 4q - 20$ $\quad 6 - 15 = 4(q - 5)$
$p - 3t = 4q - 4t$ $\quad 6 - 3 \times 5 = 4(q - 5)$

2 ¾ 3

M1 for correct substitution of p and t.
M1 for correct expansion of 4(q – t) oe (eg 4q – 20, 4q – 4t)
A1 11/4 or 2 ¾ or 2.75
or
M1 for correct substitution of p and t.
M1 for $\frac{p - 3t}{4} = q - t$ *oe*
A1 11/4 or 2 ¾ or 2.75

[7]

18. (a) $x(x - 5)$ 2

B2 for x(x – 5)
(B1 for x (linear expression in x))

(b) $15x - 6$ 1

B1

[3]

19. (a) $x(x - 5)$ 2

B2 for x(x – 5)
(B1 for (linear expression in x))

(b) $3a(a - 2)$ 2

B2 for 3a(a – 2)
(B1 for 3($a^2 - 2a$*) or* $a(3a - 6)$ *or* $3a$*(linear expression in* a*))*

(c) $2q = P - 10$ 2

$= 1/2\ (P - 10)$

M1 for correctly isolating 2q or – 2q or for correctly dividing both sides by 2 or for a correct step which may follow an incorrect first step
*A1 for ½ (*P *– 10) oe*

(d) $y^2 - y - 12$ 2

B2 for $y^2 - y - 12$
(B1 for 3 out of 4 terms in $y^2 + 3y - 4y - 12$*)*

[8]

20. (a) $20pq$ 1

B1 for 20pq oe

(b) d^4 1

B1 for d^4 cao

(c) $4 \times 3a - 4 \times 7$
$12a - 28$ 2

M1 for 4 × 3a or 4 × 7 or 12a or 28
A1 for 12a – 28 cao

(d) $4n + 6 + 3n + 3$
$7n + 9$ 2

M1 for 4n + 6 or 3n + 3
A1 for 7n + 9
B1 for t^3

(e) t^3 1

B1 for t^3
(accept t^{1+2} oe)

(f) m^2 1

B1 for m^2
(accept m^{5-3} oe)

[8]

21. (a) $3x^2 - 5xy$ 2

B2 for $3x^2 - 5xy$
(B1 for $3x^2$ or 5xy seen)

(b) $(x - 6)(x + 6)$ 1

B1 for (x – 6)(x + 6) oe

[3]

22. (a) $2a + 4c$ 1

B1 2a+4c or 2(a +2c)

(b) $½ \times ¼ \times (3)^2 = ½ \times ¼ \times 9 = 1.125$
1.125 2

M1 for substitution: $½ \times ¼ \times 3^2$ oe
A1 1.125, $1\frac{1}{8}, \frac{9}{8}$, oe

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

B2 , accept x(x + –5)
(B1 for x(linear expression in x) or x-5 seen)

(d) $x^2 + 3x + 4x + 12$
$x^2 + 7x + 12$ 2

B2 for fully correct
(B1 for 3 out of 4 terms correct in working including signs, OR 4 terms correct, with incorrect signs).

(e) $(y + 3)(y + 5)$ 2

B2 for fully correct
(B1 for $(y + a)(y + b)$ with one of $ab = 15$, $a + b = 8$)

[9]

23. (a) $4x - 12$ 1

B1 cao

(b) $4t = 18$

4.5 2

M1 for subtracting 1 from both sides seen or implied or division of all 3 terms by 4
A1 4.5 oe

[3]

24. (a) $13x + 17$ 2

*M1 for $3 \times x + 3 \times 4$ **OR** $5 \times 2x + 5 \times 1$*
A1 cao

(b) t^{10} 1

B1 cao

(c) p^3 1

B1 cao

(d) x^{12} 1

B1 cao

[5]

25. (a) a^3 1

B1 for a^3 cao

(b) $5 \times 3x - 5 \times 2$

$15x - 10$ 1

B1 for $15x - 10$ cao

(c) $3y \times y + 3y \times 4$

$3y^2 + 12y$ 2

M1 for $3y \times y + 3y \times 4$ or $3y^2 + a$ or $3y^2 + ay$ or $b + 12y$ or $by^2 + 12y$ where a ,b are integers, and can be zero
A1 for $3y^2 + 12y$ or $3 \times y^2 + 12 \times y$
NB: If more than 2 terms in expansion MOA0

(d) $2x - 8 + 3x + 6$

$5x - 2$ 2

M1 for $2 \times x - 2 \times 4$ or $2x - 8$ or $3 \times x + 3 \times 2$ or $3x + 6$
A1 for $5x - 2$ cao

(e) $x^2 + 4x - 3x - 12$

$x^2 + x - 12$ 2

M1 for 4 terms correct with or without signs, or 3 out of no more than 4 terms, with correct signs (the terms may be in an expression or table) or $x(x - 3) + 4(x - 3)$ or $x(x + 4) - 3(x + 4)$ or
A1 for $x^2 + x - 12$ cao

[8]

26. (a) $x > -2$ 2

$5x > 2 - 12$
$x > -10/5$
M1 for process to separate x and non -x terms
A1 cao

(b) $x^2 - 2x - 24$ 2

$x^2 - 6x + 4x - 24$
M1 for at least 3 correct terms
A1 cao

[4]

27. $-6x + 23$ 2

$6x + 8 - 12x + 15$
M1 for 3 correct terms
A1 cao

[2]

$2x - 24$ 2

$x^2 - 6x + 4x - 24$
M1 for at least 3 correct terms
A1 cao

[4]

28. $x^2 + 8x + 5x + 40$ 2
M1 for 3 of 4 terms correct
A1 cao

[2]

29. $y^2 + 8y + 15$ 2

$y^2 + 5y + 3y + 15$
M1 for at least 3 of 4 terms correct
A1 cao

[2]

30. (i) $8x - 12$ 2

B1

(ii) $y^2 + 8y$

B1

[2]

31. (a) $y^2 + 5y$ 1

B1

(b) $2(5x - 3)$ 1

B1

[2]

32. $x^2 + 12x + 35$ 2

$x^2 + 5x + 7x + 35$

M1 for 3 or 4 terms correct, with no extra terms.
Accept $x \times x + 5 \times x$ etc..
A1 cao

[2]

33. $x^2 - 5x - 36$ 2

$x^2 + 4x - 9x - 36$

M1 for 3 or 4 correct terms or 4 correct terms ignoring signs or $x^2 - 5x + c$, $c \neq 0$
A1 cao

[2]

34. $x^2 - 7x + x - 7$

$x^2 - 6x - 7$ 2

M1 for 3 correct terms in an expression of no more than 4 terms
A1 cao

[2]

35. $10w - 15$ 1

B1

[1]

36. (a) $12x - 15$ 1

B1 cao

(b) $5(y + 8)$ 1

B1 cao

[2]

37. (a) $6x - 4x < 7$
$x < 3.5$ oe 2

M1 for $6x - 4x < 7$
A1 for $x < 3.5$ as final answer

(b) $y^2 + 3y + 4y + 12$
$y^2 + 7y + 12$ 2

M1 for at least 3 correct terms
A1 cao

[4]

38. (a) (i) x^9 2

B1 cao

(ii) p^5

B1 cao

(b) $6g - 3$ 1

B1 cao

[3]

39. E

[1]

40. E

[1]

41. $x^2 + x - 2x - 2$

$x^2 - x - 2$ 2

M1 for exactly 4 terms correct ignoring signs (eg x^2, x, 2x, 2) or 3 correct terms out of no more than 4 terms with correct signs (ie 3 out of 4 of x^2, +x, –2x, –2)
A1 cao

[2]

42. (a) $cd + 4c$ 1

B1 for cd + 4c oe

(b) $3x + 15 + 2x - 2$
$5x + 13$ 2

B1 for 3x + 15 or 2x – 2
B1 cao

[3]

43. (a) $5(x + 2)$ 1

B1

(b) $(x - 3)(x + 5)$
$x^2 - 3x + 5x - 15$
$x^2 + 2x - 15$ 2

M1 for 3 out of 4 terms of x^2, –3x, 5x, – 15 correct
A1 for $x^2 + 2x - 15$

[3]

44. $x^2 - 3x + 4x - 12$
$x^2 + x - 12$ 2

M1 for any three of x^2, –3x, 4x, –12
A1 for $x^2 + x - 12$ cao

[2]

45 (a) $5x - y$ 2

B2 for 5x – y cao
(B1 for 5x + ny or for nx – y)

(b) $\frac{1}{2y}$ 2

B2 for $\frac{1}{2y}$ *cao*

(B1 for $\frac{2}{4y}$ *or for* $\frac{x}{2xy}$*)*

(c) $x - 3$ 1

B1 for x – 3 cao

[5]

46. D

[1]

47. E

[1]

48. (a) $6c - 4$ 1

B1 oe

(b) $x(y + 3)$ 1

B1 for x(y + 3) oe or (x + 0)(y + 3) oe

[2]

49. (a) $7e - 6f$ 2

B2 (B1 for 7e or –6f seen)

(b) $6c - 4$ 1

B1 (accept 6 × c – 4, c6 – 4 or equivalent expansion)

(c) $x(y + 3)$ 1

B1

[4]

50. C

[1]

51. (a) $4(2x + 5) + 2(3x – 2)$
$8x + 20 + 6x – 4$
$14x + 16$ 2

M1 for either $8x + 20$ or $6x – 4$ or $4 \times 2x + 4 \times 5$ or $2 \times 3x – 2 \times 2$ or $14x$ or $+ 16$
A1 for $14x + 16$

(b) $x^2 + 5x + 8x + 40$
$x^2 + 13x + 40$ 2

B2 cao
(B1 for 3 or 4 of the 4 terms correct, can be implied by $x^2 + 13x + n$ or $nx^2 + 13x + 40$)

[4]

52. A

[1]

53. D

[1]

54. (a) $6x + 9 + 2x + 2 = 8x + 11$ 2

M1 for $3 \times 2x + 3 \times 3$ or $2 \times x + 2 \times 1$ or $6x + 9$ or $2x + 2$ or $8x$ or 11
A1 for cao

(b) $y^2 + 4y - 3y - 12$

$y^2 + y - 12$ 2

M1 for 3 out of 4 terms of $y \times y + 4 \times y - 3 \times y - 3 \times 4$ correct including signs, or 4 terms excluding signs

A1 for $y^2 + y - 12$ or $y^2 + 1y - 12$ cao

[4]

1. The first part to this question was usually well attempted, with most candidates gaining the marks. The common errors were in giving $8g^2$ and $7rp$ as the answers, respectively. The second part was also well answered, but the weaker candidates spoilt their answer by writing it as $-5y$. Whilst most candidates could multiply out the brackets, very few correctly gave the final term as +15. Only partial credit was therefore earned. The collection of terms also caused many candidates some difficulty, far more so than the expansion of the brackets.

2. In part (b) many candidates were unable to combine like terms. They introduced indices where there weren't any, or made errors with minus signs. In part (b) it was inevitable that the minus sign outside the second bracketed expression caused many problems. Part (a) was rarely answered correctly; there was clear evidence that candidates simply did not understand what "factorise" meant.

3. This was another good source of marks for those candidates who had a good understanding of the rules of indices. Although all the usual misconceptions were seen, for example p^{14} and $x^{\frac{8}{3}}$, most candidates gained marks in this question.
Although the brackets in part (b) were usually expanded correctly it was disappointing to see some candidates 'simplifying' the correct answer to a single term.

4. Both parts of this were standard. The major error in part (a) was in the expansion of the second bracket to give $4x - 6$ instead of the correct $4x + 6$

5. The expansion in the first part had a low success rate and $t^2 - 2$ was seen more frequently than the correct answer. The factorisation in the final part was beyond all but the strongest candidates.

6. Questions on algebra are often not well attempted, particularly by the less able candidates, so it was pleasing that many gained reasonable marks in this question. In part (a), more than half answered (i) correctly and one third answered (ii) correctly. Many candidates gained one mark for a partially correct expression. In part (b), 60% of candidates expanded the brackets correctly in (i) and 40% were successftil in (ii). A connnon incorrect answer in (ii) was $pq - 2p^2$. In part (c), almost 70% of candidates gained at least one mark but only 15% gave a correct final answer. Mistakes were often made in the expansion and the most common error was for candidates to write –6 instead of +6.

7. In part (a) more than half of the candidates gained at least one of the two marks. Common incorrect answers were x^3 and y^7. A quarter of candidates managed to obtain three or four correct terms in part (b) but mistakes were often made in multiplying out the brackets. Part (c) was answered quite well. Some candidates omitted –2 from the solution and others included 4.

8. This question was well answered by the majority of candidates, 87% were able to expand the single bracket in (a) and 64% were able to correctly expand and collect terms in part (b).

9. More candidates appeared to understand what was required in a factorisation, but many weaker candidates wrote $p(p + 6p)$ or $7p^2$. Most candidates expanded the brackets to get four terms, though either the numerical term or negative signs were incorrect. Some simplified $– 4x + 7x$ as $– 3x$.

10. This question was generally answered well by the majority of the candidates.
In part (a), some candidates got a little confused with their multiplication and addition- a typical error was $(x + 7)(x – 4) = x^2 + 7x – 4x – 11$. In part (b), some candidates spoilt there answers by writing $y^4 + 2y^2 = 2y^6$, and in part (d), some did not completely factorise the expression.

11. Intermediate Tier

This question was not well attempted. In part (a) candidates jumped all too readily into the misconception that the answer was merely the square of the two terms: $x^2 – y^2$. Few even attempted to derive the four necessary terms.
In part (b) it was disappointing to find so many candidates incorrectly multiplying out the bracket on the left hand side, giving the result as $aq – c$. Even the ablest candidates were unable to perform manipulation of individual terms, with minus signs commonly misplaced. Algebraic manipulation is a significant weakness.

Higher Tier

In part (a) most candidates scored at least one mark. The most common errors were $x^2 - y^2$ and $x^2 - 2xy - y^2$ with $x^2 + y^2$ also being popular.
In part (b) the most common correct approach seen was to divide both sides by a first and then add c to both sides. This was seen many times. The candidates who expanded the brackets first seemed to be less successful in carrying on scoring full marks. Some candidates carried out the operations in the wrong order, adding c to both sides and then dividing by a to get $q = \frac{d+c}{a}$

12. In part (a) more than 70% of candidates answered (i) correctly. Common incorrect answers were a^{12} and $2a^7$. Candidates were less successful in (ii) with $p^{2.6}$ seen often. The answer given in (iii) was usually a product but common errors were to add 3 and 4 or to multiply the indices so that $7s^6t^5$and $12s^8t^6$ were common incorrect answers. Almost 50% of candidates expanded the bracket correctly in part (b). $5g - 3$ and $6g - 1$ were common incorrect answers and $6g$ was sometimes written as $3 \times 2g$. Candidates found part (c) difficult with less than 30% gaining full marks. Many could not start and simply added to give $2x + 5$. For those that did start, common errors were $x \times x = 2x$ and $2 \times 3 = 5$.

13. Three quarters of candidates answered part (a) correctly. It was disappointing that only 20% of candidates could factorise $x^2 + 4x$ correctly in part (b). Some tried to use two brackets. Many had no idea of what was required. In part (c), more than 60% of candidates answered (i) correctly. A common incorrect answer was m^{10}. Slightly fewer candidates were successful in (ii). It was pleasing that 40% of candidates managed to obtain three or four correct terms in part (b) but mistakes were often made in simplifying the expression. A common error in the expansion was a final term of 8 instead of 15. Common incorrect answers were $x^2 + 15$ and $2x + 8$.

14. In part (a) the minus sign presented problems for some, but usually full marks were gained. In part (b) $y^2 - 5$ was by far the most common (incorrect) response. Part (c) was not well done, with most candidates earning just one mark for multiplying out one bracket correctly. Again simple arithmetic errors cost some marks, with $2 \times 4 = 6$ and $3 \times 5 = 12$ typical of unforced errors, or poor adding of terms when simplifying.

15. All parts of this question tested algebraic processes. Most candidates were successful in showing that they could do this. The most common error was to write the answer to $(t^4)^3$ as t^7. In part (d), some candidates went on to multiply the 2 expansions rather than add them.

16. As might be expected, part (a) was answered with the most success. Some candidates, though, confused the signs and gave answers such as $6a - 4b$, $2a - 6b$ or $6a + 6b$ and some oversimplified the correct answer to $8ab$. It was disappointing that many candidates could not factorise $x^2 - 6x$ correctly in part (b). Some tried to use two brackets. Many, though, did not understand the meaning of 'factorise'. In part (c) many candidates obtained $3x$ or $3 \times x$ as the first term of the expansion but errors were frequently made with the second term. $x \times 2x^2 = 3x^2$ was a common error. Sometimes good work was spoiled in an attempt to simplify further. Part (d) was not answered well. Those with the right idea often gave a partially factorised expression as the answer and gained 1 mark.

17. In part (a) many were able to gain the first mark for expanding the brackets. Combining terms with negative signs led to problems for many, with many incorrect simplifications. A significant minority spoiled an otherwise correct answer by further incorrect simplification. In part (b) only a minority arrived at the correct answer. The most common incorrect approaches resulted in either $(x+3)(x+4)$, or a partial factorising such as $x(x+7)+10$. In part (c) substitution of values into the equations normally result in a mark being awarded, but award of marks from that point on was rare. Unlike question 11(b), here expansion of the bracket was usually done incorrectly, and manipulation of other terms poor, even though by this stage most of the terms were numeric. Most did not follow the correct order of operations necessary and added the 15 to 4 before attempting to expand. A few attempted to find the answer by trial and improvement but this was rarely successful.

18. Correct solutions to this question were seldom if ever seen. Factorisation is topic not really understood by Foundation candidates but expanding brackets was correctly attempted by about 1% of candidates.

19. As might be expected, part (a) was answered with the most success. Many candidates, though, did not understand the meaning of 'factorise'. Some of those who did identify x as the common factor gave an incorrect expression, often $x - 5x$, inside the bracket. In part (b), partially factorised expressions, i.e. $3(a^2 - 2)$ or more often $a(3a - 6)$, were almost as common as the correct answer. Part (c) was answered very poorly and provided little evidence that candidates were able to set out simple algebraic methods. Some candidates simply interchanged P and q in the formula and many gave incorrect answers such as $P - 10/2$, $P/2 - 10$ or $P - 5$ without any working. Since candidates had to perform two steps to rearrange the formula, a correct step, if seen, would have gained one mark. Part (d) was better attempted than part (c). More than a quarter of the candidates gained one mark but relatively few achieved both marks either through making a sign error in the multiplication or an error in collecting the y terms. Many candidates showed no understanding of what was required and added the two expressions or introduced an equals sign.

20. This question was done well by the majority of the candidates. In part (a), most candidates were able to write down the answer $20pq$. Common incorrect answers here were $4p5q$, 9pq, $20p^2$ and $20q^2$. In part (b), the vast majority of candidates were able to write down the answer d^4. A very common incorrect answer here was $4d$. In part (c), about half the candidates were able to gain both marks. Common incorrect answers here were $12a - 7$, $7a - 28$ and $12a - 21$. In part (d), about three quarters of the candidates were able to score both marks and many that didn't were able to score a mark for either $4n + 6$ or $3n + 3$. Common incorrect answers here were $(4n + 6) + (3n + 1) = 7n + 7$ and $(4n + 3) + (3n + 3) = 7n + 6$ (each gaining 1 mark); and $(4n + 3) + (3n + 1) = 7n + 4$ (for 0 marks). A surprising number of candidates multiplied the expressions $(4n + 3) \times (3n + 3)$ instead of adding them. Parts (e) and (f) were generally done well. Common incorrect answers here were $(t \times t^2 =) t^2$ and $(m^5 \div m^3 =) m^{5/3}$ or m^{15}.

21. In part (a), many candidates were able to score at least 1 mark on this question. Common incorrect answers were and(each scoring 1 mark). A small number of candidates expanded the expression to, e.g. $3x \times x - 5x \times y$, then did not go on to simplify it. In part (b), about half the candidates were able to factorise the expression correctly. Common incorrect answers here were $(x - 6)^2$, $x(x - 36)$ and $(x - 6)$.

22. This question gave students the opportunity to display their skills of algebraic manipulation and of algebraic substitution.
Usually candidates were successful on part (a), although there were many wrong answers, mainly from a misunderstanding of the relationship of the sign in a term with the term it acted on.

Part (b) had many cases of poor substitution, where, for example, $\frac{1}{4} \times 3^2$ was evaluated as $\left(\frac{1}{4} \times 3^2\right)$

Parts (c), (d) and (e) were all well done. The most common error in (c) was the difference of 2 squares misunderstanding as $(x - 5)(x + 5)$ or $(x - 2.5)(x + 25)$. The clumsy, but correct was awarded both marks.

On (d), the characteristic $x^2 + 7x + 7$ was occasionally seen and on (e) the 'factorisation' $y(y + 8) + 15$

23. Part (a) was answered correctly by just over three quarters of candidates. The most common error was to multiply just the numerical term by 4 Part (b) was answered more successfully with approximately 85% of candidates solving the equation correctly.

24. Around 62% of candidates gained full marks in part (a). The most common error was to make a mistake in multiplying out one of the brackets. Over 85% of candidates answered part (b) correctly this dropped to 80% for part (c) and 56% for part (d).

25. Parts (a) and (b) were generally well answered. The most common incorrect answer in (a) was 3a. In part (c) Most candidates managed to expand $3y \times y$ correctly and simplify to $3y^2$ but a few did not multiply $3y$ by 4 and just wrote 12 rather than $12y$. Hence $3y^2 + 12$ was the most common error seen. Expansion of both brackets in part (d) did not usually cause problems although a few multiplied the brackets together. Simplification caused more difficulties with the –8 term added leading to $5x + 14$ or a common arithmetic slip giving $2x + 3x = 6x$ Again, in part (e) the expansion of brackets was often successfully tackled but simplification led to more errors, caused usually by difficulties dealing with the negative terms. In the expansion, 4 and –3 were added rather than multiplied to give 1 leading to $x^2 + x + 1$ or just $x^2 + 1$. $–3x$ and $4x$ were sometimes combined to give $–x$ and a common mistake was to ignore the – sign and add these 2 terms to give $x^2 + 7x – 12$.

26. In part (a) the majority of candidates were able to separate the x terms correctly. However, the final accuracy mark was often not gained because candidates gave their final answer to this inequality as either $x = –2$ or just –2.
Part (b) was generally well done. Common errors occurred when candidates either failed to simplify the x terms incorrectly or wrote the independent term as + 24.

27. The majority of candidates showed an ability to expand brackets by multiplication but, as may have been predicted, often failed to multiply the –5 by –3 giving an initial simplification as $6x + 8 – 12x – 15$; this gained 1 mark only. In some case when the first step had been correct, incorrect algebra followed to give answers such as $18x + 23$ and $6x$ +23.

28. This question was generally well answered although a constant term of +13 rather than +40 seemed to be the most common error.

29. A straightforward question that was answered correctly by the majority of candidates. Most errors arose from adding instead of multiplying the 3 and 5 to give the final term in the expression as 8 rather than 15. A minority of candidates gave the answer simply as $y^2 + 15$ and thus scored no marks.

30. The algebraic expressions in the final question appeared to cause a high degree of difficulty for the candidates with fewer than 10% of the candidates multiplying out (i) correctly. The urge to arrive at a numerical outcome by some evaluation of the expression led to many unusual answers. For those who appreciated that an algebraic solution was required, they tended to obtain answers such as $5x$, $3x$ and $7x$.
In part (ii) fewer than 2% were able to expand the bracket with $10y$ being the most common incorrect response. Very few candidates provided two terms in their answer to either part of this question.

31. Both parts of this question were poorly done, and part (a) particularly gives cause for concern at this level. Here answers of $y^2 + 5$ and $2y + 5$ were common. In part (b) $4x$ was the most common incorrect response. A significant number of candidates took out a common factor of 2 and left it out leaving an answer of $5x – 3$ only.

32. Nearly a half of the candidates scored at least one mark for finding 3 or 4 correct terms, however poor algebraic manipulation often restricted further progress. The sum of 7 and 5 was seen on many occasions instead of the product. Answers of $7x + 5x = 12x$, $2x + 12$, $x^2 + 35$ and $x^2 + 12$ were common mistakes made by weaker candidates.

33. Only 10% of candidates failed to gain any marks for this question; just under 70% of candidates were able to gain full marks on this routine question. Common errors included simplifying $–9x + 4x$ to $–13x$, writing $2x$ instead of x^2 and giving +36 instead of –36.

34. Many candidates gained one mark in part (a) for correctly working out at least 3 correct terms, often using a tabular method; however inaccuracies in the use of directed numbers saw many go no further. Common incorrect efforts by more able candidates included, $x^2 + 6x$ (or $\pm 8x$), while weaker candidates often gave $x^2 – 6$ or $2x – 6$ as their answer.

35. Expanding the expression ‘$5(2w – 3)$’ did not immediately suggest that a multiplication was involved to many candidates. Expressions like ‘$10w – 7$’ and ‘$10w – 3$’ were common as was ‘$7w – 8$’ indicating that they perceived the operation as being addition and subtraction rather than multiplication. Only just over 10% were able to correctly expand the bracket.

36. No report available.

37. In part (a) the majority of candidates were able to carry out the correct algebraic processes in order to solve the inequality. Not all candidates, however, gave their final answer as an inequality. Candidates should be reminded that solutions to inequalities should always contain the appropriate inequality sign rather than an equal sign. Part (b) was answered correctly by approximately 80% of candidates. The most common error seen was to give 3×4 as 7 rather than 12. Another common error was to expand correctly but then simplify incorrectly, often trying to combine x and x^2 terms.

38. Parts (i) and (ii) of part (a) were usually correctly answered. In part (b) answers of $6g - 1$, $3 \times 2g - 1$ and $3g$ (after getting $6g - 3$) were often seen.

39. No Report available for this question.

40. No Report available for this question.

41. A variety of methods to expand a pair of brackets were demonstrated and often very successfully; however careless arithmetic of directed numbers lead to many errors, though some credit for work seen was often possible.

$x^2 - x - 2x - 2$, $x^2 + x - 2x - 1$ and $x^2 + x - 2x + 2$ were typical expansions and $+ x - 2x$ often lead to an incorrect simplification of $+x$ or $\pm 3x$.

42. Many candidates were clearly confused by the letter outside of the bracketed expression rather than a number in part (a). $cd + 4$ and $4cd$ were the most likely incorrect answers to be seen. In part (b), many candidates were able to score one mark for the correct expansion of either of the bracketed terms, but a great many failed to do even this with $3x + 5 + 2x - 1$ leading to an answer of $5x + 4$ and sometimes $5x + 6$ in many cases. Some candidates quoted the correct answer of $5x + 13$ but then gave $18x$ as their answer by further attempts to simplify. This loses one of the two marks.

43. This question was poorly answered with few candidates able to factorise in part (a) but they had more success in part (b) with many candidates being able to gain at least one mark for multiplying out two brackets and getting 3 out of the 4 terms (x^2, $-3x$, $5x$, -15) correct but very few candidates were completely successful in giving the fully simplified answer.

44. This question was answered correctly by about 50% of candidates. The other 50% of candidates gained at least one mark for multiplying out two brackets and getting 3 out of the 4 terms (x^2, $-3x$, $4x$, -12) correct. Very few candidates scored no marks.

45. Part (a) was the most successful though a surprising number of candidates incorrectly oversimplified their correct answer. Part (b) and (c) were not well answered though some candidates gained partial credit in (b) for writing $\frac{x}{2xy}$ or $\frac{2}{4y}$.

46. No Report available for this question.

47. No Report available for this question.

48. Algebra is not usually a strong point of candidates entered for foundation tier and they showed that in this paper there was no exception to this. In part (a) only 20% gained the mark and in part (b) where factorising was a requirement this reduced to 7%.

Many candidates tried to over simplify their algebraic expressions and therefore scored no marks.

49. This algebra question was quite well answered. Almost 90% of candidates were awarded some credit for their answers to part (a). Common incorrect answers seen included 7e and 7e +6f. These could be awarded 1 mark for one correct term. The second part of the question was correctly answered by 84% of candidates whilst the success rate in the last part was 65%. In part (c) common incorrect answers included $3x^2y$, $4xy$ and $x(y + 2x)$.

50. No Report available for this question.

51. This was a standard expand and simplify question with a single bracket used in part (a) and two brackets in part (b). It was gratifying to see 42% of candidates obtaining all four marks for the question with a further 23% gaining 3 out of the four marks. The most common errors were for writing 20 – 4 as –16 or 24 in part (a) and only getting 3 out of the 4 terms correct when the two linear terms in x were multiplied.

52. No Report available for this question.

53. No Report available for this question.

54. Only about one in three candidates scored full marks in this question.

In part (a) most candidates were able to expand at least one of the expressions "3(2x + 3)" and "2(x + 1)" successfully to gain 1 mark. However, it is disappointing to report that it was common to see candidates then attempting to multiply "6x + 9" and "2x + 2" or incorrectly combine them in some other way. Perhaps surprisingly, just as many candidates were successful in part (b) as in part (a). In this part of the question, in cases where a candidate could not be awarded both marks, examiners were often able to give one mark for either 3 out of 4 correct terms in their expansion or for 4 terms with some incorrect signs.