1. (a) Expand and simplify

$(x + y)^2$

.....

(2)

(b) Hence or otherwise find the value of

$3.47^2 + 2 \times 3.47 \times 1.53 + 1.53^2$

.....

(2)
(Total 4 marks)

2. (a) Simplify $k^5 \div k^2$

.....

(1)

(b) Expand and simplify

(i) $4(x + 5) + 3(x - 7)$

.....

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

.....

(4)

(c) Factorise $(p + q)^2 + 5(p + q)$

.....

(1)

(d) Simplify $(m^{-4})^{-2}$

.....

(1)

(e) Simplify $2t^2 \times 3r^3t^4$

.....

(2)

(Total 9 marks)

3. (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)

(d) Find the value of

(i) $36^{-\frac{1}{2}}$

.....

(ii) $27^{\frac{2}{3}}$

.....

(2)
(Total 8 marks)

4. (a) Simplify

$$x^5 \div x^2$$

……

(1)

(b) Simplify

$$2w^4y \times 3w^3y^2$$

……

(2)
(Total 3 marks)

5. Simplify

$$\frac{3(x+2)^2}{x+2}$$

.....

(Total 1 mark)

6. Simplify fully $5x^3y^4 \times 7xy^2$

……

(Total 2 marks)

7. Simplify $\dfrac{15a^3\,b^7}{3a^2\,b^3}$

……

(Total 2 marks)

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

.....

(2)

(b) Factorise completely $3x^2 + 6xy$

.....

(2)
(Total 4 marks)

9. (a) Factorise completely $2(x - 5)^2 + 3(x - 5)$

.....

(2)

(b) Simplify $\dfrac{3(y-4)}{(y-4)^2}$

.....

(1)
(Total 3 marks)

10. Simplify fully $(3xy^2)^4$

…….

(Total 2 marks)

11. (a) Simplify $x^4 \div x^9$

.....

(1)

(b) Simplify $3w^5y^2 \times 4w^3y^4$

.....

(2)

(Total 3 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 $2d(d + 3)$

…….

(2)

(Total 7 marks)

1. $x^2 + 2xy + y^2$ 2

$x^2 + xy + xy + y^2$

M1 for at least 3 of the 4 terms correct
A1 cao

25 2

M1 for recognising 3.47 + 1.53 (= 5)
A1 cao

[4]

2. (a) k^3. 1

B1 for k^3.

(b) (i) $7x - 1$ 4

$4x + 20 + 3x - 21$

*M1 for **three** of 4 terms $4x + 20 + 3x - 21$ (or better)*
A1 for $7x - 1$

(ii) $x^2 + 5xy + 6y^2$

$x^2 + 3xy + 2xy + 6y^2$

*M1 for **three** of 4 terms $x^2 + 3xy + 2xy + 6y^2$*
A1 for $x^2 + 5xy + 6y^2$

(c) $(p + q)(p + q + 5)$ 1

B1 for $(p + q)(p + q + 5)$

(d) m^8 1

B1 for m^8.

(e) $6r^3t^6$ 2

B2 for $6r^3t^6$
(B1 for $.....r^3t^6$ or for $6...t^6$)

[9]

3. (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)

(d) (i) $\frac{1}{6}$ 1

B1 cao accept $\pm\frac{1}{6}$ *or* $-\frac{1}{6}$

(ii) 9 1

$27^{\frac{2}{3}} = (3)^2$
B1 cao

[8]

4. (a) x^3 1

B1 cao

(b) $6w^7y^3$ 2

B2 cao (B1 for any 2 of 6, w^7, y^3)

[3]

5. $3(x + 2)$ oe 1

B1 for 3(x + 2) or better

[1]

6. $35x^4y^6$ 2

B2
(B1 for any 2 of 35, x^4, y^6)

[2]

7. $5ab^4$ 2

B2 cao
(B1 for 2 of 5, a, b^4 correct)

[2]

8. (a) $12x^2 + 11x + 2$ 2

$12x^2 + 8x + 3x + 2$

M1 for expansion (condone one error)
A1 cao

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

B2 cao
(B1 for 3x( ) or __(x + 2y) or 3(x^2 + 2xy) or x(3x + 6y))

[4]

9. (a) $(x – 5)(2x – 7)$ 2

$(x – 5)(2x – 10 + 3)$

M1 for (x – 5) (2(x – 5) + 3) or for identifying (x – 5) as a common factor or $2x^2 – 17x + 35$
A1 cao

(b) $\frac{3}{y-4}$ 1

B1 cao

[3]

10. $81x^4y^8$ 2

$3^4x^4y^8$

B2 for $81x^4y^8$
(B1 for 2 of 81, x^4, y^8)

[2]

11. (a) x^{-5} 3

B1 for x^{-5} or $\frac{1}{x^2}$

(b) $12w^8y^6$

B2 for w^8y^6

(B1 for any 2 of 12, w^8, y^6 correct)

[3]

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) $2d^2 + 6d$ *2*

B2 cao

(B1 for $2d^2$ or $6d$)

[7]

1. Paper 3

It is disappointing that so few candidates were able to make a reasonable attempt at the expansion of the brackets. Predictably $x^2 + y^2$ was the most common (incorrect) answer seen. No candidates appeared to make the connection between the two parts. Instead there were many long attempts at quite complex long multiplication solutions, most unsuccessful.

Paper 5

Many candidates were able to correctly expand the double brackets but some then had problems simplifying the 'middle two' terms. Only a minority saw the connection between the two parts and frequently embarked on three long multiplications with very little success. Some of those who spotted the connection unfortunately made a subsequent basic error and wrote "$(3.47 + 1.53)^2 = 6^2 = 36$."

2. **Mathematics A Paper 7**

In this algebraic expressions question the vast majority of candidates obtained the correct answer to part (a), the method marks in part (b) and, less so, a mark in part (e). The common errors were writing "6y" instead of "6y^2" in the expansion in part (b)(ii), expanding everything in (c) and then 'moving on', writing m^{-6} as the wrong answer to part (d) and failing to simplify "2 × 3" as "6" in the final part.
In part (c), which was answered badly, some of the better attempts failed to gain the mark because the brackets were missing around the common factor with answers being left as "p+q(p+q+5)"

Mathematics B Paper 18

Part (a) was answered correctly by the vast majority of candidates. Part (bi) was mostly answered correctly. In (bii) $3y \times 2y$ was frequently evaluated as $6y$ rather than $6y^2$. Parts (c) and (d) were poorly done; only a very few correct answers were seen. In part (e), the common error was to leave the answer as $2t^6 \times 3r^3$. Some candidates erroneously introduced an addition sign into the expression.

3. This was a straightforward question that tested candidates knowledge of a range of algebraic topics. About 70% of candidates were able to cope correctly with the powers in part (a) and 75% were able to correctly multiply out a pair of brackets in part (b) whilst nearly 80% were able to list the correct integers in a combined inequality in part (c). Candidates were not so successful in dealing with negative and fractional indices with 50% success in raising 36 to the power of – ½ and 55% in identifying 9 as 27 to the power two thirds.

4. Well answered by the majority of candidates. In part (b), some candidates incorrectly introduced an addition sign. A number of candidates added the integer parts together instead of multiplying.

5. This question proved far more problematic and a correct answer was not seen often. The majority of candidates tried to expand $3(x + 2)^2$ instead of cancelling and this led to many algebraic errors and never the correct answer.

6. The majority of candidates were able to score at least 1 mark for this question. The most common errors were to evaluate 7 × 5 as 12 or $x \times x^3$ as x^3.

7. This question was more successfully answered with the majority of candidates obtaining at least one mark. A few candidates left 1 in the denominator and a few did 15 – 3 = 12 instead of 15 ÷ 3 = 5 thus $12ab^4$ was a common incorrect answer.

8. Factorisation (part (b)) was much better understood than the expanding of brackets. In part (a) common errors were $4x \times 3x = 12x$ (leading to an answer of $23x + 2$) and $2 \times 1 = 3$. Many candidates merely added all the terms to get $7x + 3$. In part (b) incomplete factorisation was not uncommon and some candidates believed that they had to simplify the expression and gave $9x^3y$ as their answer.

9. Only a very small minority of candidates were able to gain any credit for part (a). The majority of candidates attempted to expand the brackets and then made errors. Of those candidates who used this method a number were able to simplify the expression to the correct quadratic expression and a very few candidates were then able to factorise this correctly. Very few candidates spotted the common factor in part (a). Candidates were more successful in part (b).

10. Only about 40% of candidates were able to gain any credit in this question. The common error was only to raise the last part of the given expression to the power of 4.

11. Approximately 70% of candidates were able to give correct solutions to both parts if this question. The common error in (a) was to give the answer as x^5 instead of x^{-5}. In part (b), candidates frequently added the integer parts of the expressions of made an error in one of the powers.

12. Approximately 85% of candidates were able to answer all of part (a) correctly. In part (b) only about three quarters of candidates were able to expand the bracket correctly.