# 2.6 Simplifying Algebra: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** Simplify $2n^3 \times 9n^4$

**(Total for Question 1 is 2 marks)**

**2** A rectangle has length (4x + 2) cm and width (2x + 2) cm. Write an expression, in its simplest form, for the perimeter of the rectangle.

Diagram NOT accurately drawn




**(Total for Question 2 is 2 marks)**

**3** Expand and simplify 5(x + 3) + 7(x + 4)

**(Total for Question 3 is 3 marks)**


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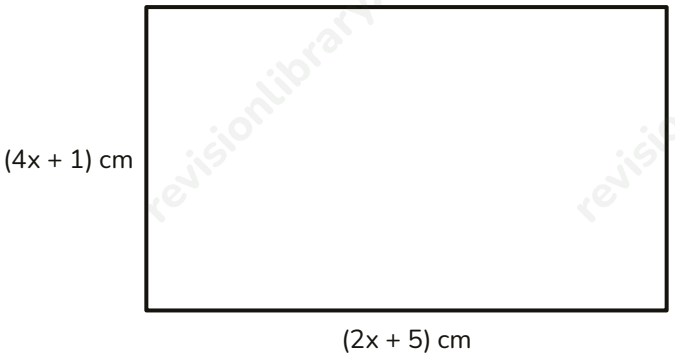
**4** Simplify $7b^3 \times 8b$

**(Total for Question 4 is 2 marks)**

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**5** A rectangle has length (2x + 5) cm and width (4x + 1) cm. Write an expression, in its simplest form, for the perimeter of the rectangle.

Diagram NOT accurately drawn




**(Total for Question 5 is 2 marks)**

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**6** Expand and simplify 7(x - 6) + 7(x - 5)

**(Total for Question 6 is 3 marks)**

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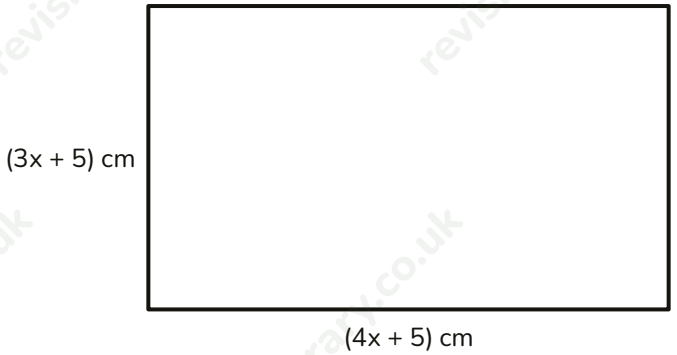
**7** Simplify 7m - 2n - 3m + 6n

**(Total for Question 7 is 2 marks)**


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**8** A rectangle has length (4x + 5) cm and width (3x + 5) cm. Write an expression, in its simplest form, for the perimeter of the rectangle.

Diagram NOT accurately drawn




**(Total for Question 8 is 2 marks)**

**9** Expand and simplify 4(x + 2) + 4(x + 4)

**(Total for Question 9 is 3 marks)**

**10** Simplify each expression.

**(a)** a x a **(1)**

**(b)** b x b x b **(1)**

**(Total for Question 10 is 2 marks)**


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**11** Simplify each expression.

**(a)** 3a x 2b **(1)**

**(b)** 5x x 4y **(1)**

**(Total for Question 11 is 2 marks)**

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**12** Simplify each expression.

**(a)** 12a / 4 **(1)**

**(b)** 20b / 5 **(1)**

**(Total for Question 12 is 2 marks)**

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**13** Expand and simplify 6x - (x - 7)

**(Total for Question 13 is 2 marks)**

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**14** Simplify 4p + 3q - r - p + 2r - q

**(Total for Question 14 is 2 marks)**

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**15** Simplify $5x^2 + 3x - 2x^2 + 4x$

**(Total for Question 15 is 2 marks)**


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**16** Simplify each expression.

**(a)** $3a^2 \times 4a^3$ **(1)**

**(b)** $(b^3)^2$ **(1)**

**(Total for Question 16 is 2 marks)**

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**17** Simplify each expression.

**(a)** $15xy / 5x$ **(1)**

**(b)** $24pq / 6p$ **(1)**

**(Total for Question 17 is 2 marks)**

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**18** Simplify each expression.

**(a)** $(4x)^2$ **(1)**

**(b)** $(2y)^3$ **(1)**

**(Total for Question 18 is 2 marks)**

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**19** Simplify $5x + 3x$.

**(Total for Question 19 is 1 mark)**

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**20** Simplify $7y - 2y + 4y$.

**(Total for Question 20 is 1 mark)**


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**21** Simplify 4x - 3 + 2x + 9.

**(Total for Question 21 is 1 mark)**

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**22** Simplify 9h - 3h - 2h.

**(Total for Question 22 is 1 mark)**

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**23** Simplify 5p + 4q - 2p + q.

**(Total for Question 23 is 1 mark)**

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**24** Simplify each expression.

**(a)** $a^2 \times a^5$ **(1)**

**(b)** $a^7 / a^3$ **(1)**

**(Total for Question 24 is 2 marks)**

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**25** Expand and simplify 3(x + 4) - 2(x - 1)

**(Total for Question 25 is 3 marks)**

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**26** Expand and simplify 2(x + 5) + 3(x - 2)

**(Total for Question 26 is 3 marks)**


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**27** Expand and simplify -2(3x - 1) - (x - 5)

**(Total for Question 27 is 3 marks)**

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**28** Simplify $(12a^5 b^3) / (4a^2 b)$

**(Total for Question 28 is 2 marks)**

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**29** Simplify $x^5 / x^2$.

**(Total for Question 29 is 1 mark)**

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**30** Simplify 3m + 2n - 5m - 6n.

**(Total for Question 30 is 2 marks)**

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**31** Simplify $(6x^3) / (3x)$.

**(Total for Question 31 is 2 marks)**

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**32** Simplify $(2a^3 * a^2) / a$.

**(Total for Question 32 is 2 marks)**


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**33** Simplify $4x^2 * 3x^3$.

**(Total for Question 33 is 2 marks)**

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**34** Simplify $(12x^5 y^3) / (4x^2 y)$.

**(Total for Question 34 is 2 marks)**

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**35** Expand and simplify 15 - 2(3y - 4).

**(Total for Question 35 is 2 marks)**

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**36** Simplify $5a^2 b \times 3ab^3$.

**(Total for Question 36 is 2 marks)**

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**37** Simplify $(x^3)^4$.

**(Total for Question 37 is 1 mark)**

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**38** Simplify $(x^4 * x^{-2}) / x$.

**(Total for Question 38 is 2 marks)**


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**39** Simplify $2x(3x - 4) - x(x - 5)$.

**(Total for Question 39 is 3 marks)**

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**40** Given $f(t) = 4t^2 - 3t + 6$,

**(a)** Simplify $f(t) - (t^2 + 2t - 1)$. **(2)**

**(b)** Evaluate your result from part (a) at $t = 2$. **(1)**

**(Total for Question 40 is 3 marks)**

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**41** Simplify $(2x^4 y^{-2}) \times (3x^{-1} y^5)$.

**(Total for Question 41 is 2 marks)**


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**42** Simplify $(2x)^2 + 3x(x - 1)$.

**(Total for Question 42 is 3 marks)**

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**43** Given $g(x) = 5x^2 - 2x + 3$,

**(a)** Simplify $g(x) - (2x^2 - 3x + 1)$. **(2)**

**(b)** The table below shows two values of x. Use your answer to part (a) to complete the table, giving each value of $3x^2 + x + 2$. **(2)**

| x | -2 | 3 |
|---|---|---|
| $3x^2 + x + 2$ | ___ | ___ |

**(Total for Question 43 is 4 marks)**


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# Mark scheme · 2.6 Simplifying Algebra: 2-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

## Question 1

18 or $n^7$ seen **M1**
$18n^7$ cao **A1**
**Answer: $18n^7$**

## Question 2

adds the length and width and doubles, or adds all four sides **M1**
(12x + 8) cm cao **A1**
**Answer: (12x + 8) cm**

## Question 3

expands one bracket correctly **M1**
expands both brackets correctly **M1**
12x + 43 cao **A1**
**Answer: 12x + 43**

## Question 4

56 or $b^4$ seen **M1**
$56b^4$ cao **A1**
**Answer: $56b^4$**

## Question 5

adds the length and width and doubles, or adds all four sides **M1**
(12x + 12) cm cao **A1**
**Answer: (12x + 12) cm**

## Question 6

expands one bracket correctly **M1**
expands both brackets correctly **M1**
14x - 77 cao **A1**
**Answer: 14x - 77**

## Question 7

4m or 4n seen (one pair of like terms correctly collected) **M1**
4m + 4n oe cao **A1**
**Answer: 4m + 4n**

## Question 8

adds the length and width and doubles, or adds all four sides **M1**
(14x + 20) cm cao **A1**
**Answer: (14x + 20) cm**

## Question 9

expands one bracket correctly **M1**
expands both brackets correctly **M1**
8x + 24 cao **A1**
**Answer: 8x + 24**

## Question 10

(a) $a^2$ cao **B1**
**(a) Answer: $a^2$**
(b) $b^3$ cao **B1**
**(b) Answer: $b^3$**

## Question 11

(a) 6ab oe cao **B1**
**(a) Answer: 6ab**
(b) 20xy oe cao **B1**
**(b) Answer: 20xy**

## Question 12

(a) 3a cao **B1**
**(a) Answer: 3a**
(b) 4b cao **B1**
**(b) Answer: 4b**

## Question 13

-x + 7 seen (bracket correctly expanded, treating the missing coefficient as -1) **M1**
5x + 7 oe cao **A1**
**Answer: 5x + 7**

## Question 14

3p, 2q or r seen (at least one letter correctly collected) **M1**
3p + 2q + r oe cao **A1**
**Answer: 3p + 2q + r**

## Question 15

$3x^2$ or 7x seen ($x^2$ terms and x terms correctly collected separately) **M1**
$3x^2$ + 7x oe cao **A1**
**Answer: $3x^2$ + 7x**

## Question 16

(a) $12a^5$ cao **B1**
**(a) Answer: $12a^5$**
(b) $b^6$ cao **B1**
**(b) Answer: $b^6$**

## Question 17

(a) 3y cao **B1**
**(a) Answer: 3y**
(b) 4q cao **B1**
**(b) Answer: 4q**

## Question 18

(a) $16x^2$ cao **B1**
**(a) Answer: $16x^2$**
(b) $8y^3$ cao **B1**
**(b) Answer: $8y^3$**


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## Question 19

8x cao **B1**

**Answer: 8x (cao)**

## Question 20

9y cao **B1**

**Answer: 9y (cao)**

## Question 21

6x + 6 cao **B1**

**Answer: 6x + 6 (cao)**

## Question 22

4h cao **B1**

**Answer: 4h (cao)**

## Question 23

3p + 5q cao **B1**

**Answer: 3p + 5q (cao)**

## Question 24

(a) $a^7$ cao **B1**

**(a) Answer: $a^7$**

(b) $a^4$ cao **B1**

**(b) Answer: $a^4$**

## Question 25

3x + 12 seen (first bracket expanded correctly) **M1**

-2x + 2 seen (second bracket expanded correctly, signs handled) **M1**

x + 14 oe cao **A1**

**Answer: x + 14**

## Question 26

2x + 10 seen (first bracket expanded correctly) **M1**

3x - 6 seen (second bracket expanded correctly) **M1**

5x + 4 oe cao **A1**

**Answer: 5x + 4**

## Question 27

-6x + 2 seen (first bracket correctly expanded, including its sign) **M1**

-x + 5 seen (second bracket correctly expanded, treating the missing coefficient as -1) **M1**

-7x + 7 oe cao **A1**

**Answer: -7x + 7**

## Question 28

3, $a^3$ or $b^2$ seen (at least one part of the answer correctly simplified) **M1**

$3a^3b^2$ oe cao **A1**

**Answer: $3a^3b^2$**

## Question 29

$x^3$ cao (use of index subtraction 5 - 2) **B1**

**Answer: $x^3$ (cao)**

## Question 30

collects m terms and n terms separately, e.g. 3m - 5m and 2n - 6n identified **M1**

-2m - 4n oe cao **A1**

**Answer: -2m - 4n (oe cao)**

## Question 31

divide coefficients 6/3 and subtract indices 3 - 1 **M1**

$2x^2$ cao **A1**

**Answer: $2x^2$ (cao)**

## Question 32

multiply indices for a: 3 + 2 = 5 then divide by a (subtract 1) **M1**

$2a^4$ cao **A1**

**Answer: $2a^4$ (cao)**

## Question 33

multiply coefficients 4*3 and add indices 2+3 **M1**

$12x^5$ cao **A1**

**Answer: $12x^5$ (cao)**

## Question 34

divide coefficients 12/4 = 3 and subtract indices for x (5 - 2) and for y (3 - 1) **M1**

$3x^3 y^2$ cao **A1**

**Answer: $3x^3 y^2$ (cao)**

## Question 35

correct expansion -6y + 8 shown, i.e. -2 x 3y = -6y and -2 x (-4) = +8 **M1**

23 - 6y oe cao **A1**

**Answer: 23 - 6y (oe cao)**

## Question 36

multiply coefficients 5 x 3 = 15 and add indices for a (2 + 1) and for b (1 + 3) **M1**

$15a^3 b^4$ cao **A1**

**Answer: $15a^3 b^4$ (cao)**

## Question 37

$x^{12}$ cao (use of index law 3 x 4 = 12) **B1**

**Answer: $x^{12}$ (cao)**

## Question 38

use index laws: $x^4 * x^{-2} = x^{4 + (-2)} = x^2$, then divide by x (subtract 1) **M1**

x cao **A1**

**Answer: x (cao)**

## Question 39

expand 2x(3x - 4) to $6x^2$ - 8x **M1**

expand x(x - 5) to $x^2$ - 5x and subtract from previous expression **M1**

$5x^2$ - 3x cao **A1**

**Answer: $5x^2$ - 3x (cao)**


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## Question 40

(a) subtract like terms: $4t^2 - t^2$ and $-3t - 2t$ and $6 - (-1)$ **M1**

(a) $3t^2 - 5t + 7$ cao **A1**

**(a) Answer: $3t^2 - 5t + 7$ (cao)**

(b) 9 cao **B1**

**(b) Answer: 9 (cao)**

## Question 41

multiply coefficients $2 \times 3 = 6$ and add indices for x $(4 + (-1))$ and for y $(-2 + 5)$ **M1**

$6x^3 y^3$ cao **A1**

**Answer: $6x^3 y^3$ (cao)**

## Question 42

squares the term $(2x)^2 = 4x^2$ **M1**

expand $3x(x - 1)$ to $3x^2 - 3x$ and add to the previous term **M1**

$7x^2 - 3x$ cao **A1**

**Answer: $7x^2 - 3x$ (cao)**

## Question 43

(a) subtracts like terms: $5x^2 - 2x^2$ and $-2x - (-3x)$ and $3 - 1$ **M1**

(a) $3x^2 + x + 2$ cao **A1**

**(a) Answer: $3x^2 + x + 2$ (cao)**

(b) 12 cao (when $x = -2$) **B1**

(b) 32 cao (when $x = 3$) **B1**

**(b) Answer: 12 and 32 (cao)**


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