JUNIOR CYCLE MATHS · FREE REVISION SHEET

Variables & expressions

↗ Léim

Learning outcomes (2018 specification): AF.2a, AF.2b, AF.3a, U.4. Play the game: **leim.ie/like-term-sweep.html**

1. The words

A **variable** is a letter standing for a number that can change. An **expression** is made of **terms** joined by + and − signs: $4x^2 - 3x + 7$ has **3 terms**. The **coefficient** of x is the number in front, sign included: **−3**. The **constant** is the term with no letter: **7**.

2. Writing it the short way

3 × n	**3n**	n × n	**n^2**
a × b	**ab**	n ÷ 2	**n/2**
n + n + n	**3n**	1x	**x**

3. Collecting like terms

Like terms have exactly the same letters and powers (3x and −5x; xy and yx). 3x and $3x^2$ are **not** like terms. Each term keeps the sign in **front** of it.

5a + 3b − 2a + b = **3a + 4b**

$2x^2 + 5x - x^2 - 8x + 3$ = **$x^2 - 3x + 3$**

$x^2 + x^2 = 2x^2$ (not x^4) · 3x + 2y can't be simplified

4. Words into algebra

"5 more than n" → **n + 5** · "5 less than n" → **n − 5** (not 5 − n) · "double n, then subtract 3" → **2n − 3** · "half of n" → **n/2**.

Tickets at €8 each plus a €3 booking fee: n tickets cost **8n + 3** (the fee is paid once). Perimeter: add **all** the sides.

5. Substitution

Put each number in **brackets**, then follow BIMDAS.

Find	Working
5 − 2x, x = −3	5 − 2(−3) = 5 + 6 = **11**
x^2, x = −4	$(-4)^2$ = **16** (not −16)
$3x^2$, x = −2	3 × 4 = **12** (square first)
ab − b, a = −2, b = 5	−10 − 5 = **−15**

2x when x = 3 is 2 × 3 = 6, not 23. A number next to a letter means multiply.

Exam tip: use brackets for negative numbers and write the line where you put them in: it earns marks even if the answer slips. Check an expression by trying a number: 2 tickets should cost 8(2) + 3 = €19.

PRACTICE · 34 QUESTIONS

Have a go

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A. Simplify

1. $5x + 3x$ _____
2. $7a - 2a + a$ _____
3. $4x + 3y - x + 2y$ _____
4. $6m - 2n - 4m + 5n$ _____
5. $3p - 5 + 2p + 9$ _____
6. $x^2 + 4x + 2x^2 - x$ _____
7. $5ab + 2a - 3ab + a$ _____
8. $8 - 3t - 2 + 5t$ _____

B. Write as an expression

9. 7 more than n _____
10. 4 less than x _____
11. n multiplied by 6 _____
12. Double y, then add 9 _____
13. Half of p _____
14. Subtract t from 10 _____
15. Pens cost €2 each. A pencil case costs €5. Write the cost, in euro, of the case and n pens. _____
16. A rectangle has length 3x and width x + 2. Write its perimeter in its simplest form. _____

C. Find the value

17. $4x + 5$ when $x = 2$ _____
18. $4x + 5$ when $x = -2$ _____
19. $10 - 3x$ when $x = -4$ _____
20. x^2 when $x = -5$ _____
21. $2x^2$ when $x = -3$ _____
22. ab when $a = -3$ and $b = 4$ _____
23. $3a - 2b$ when $a = -1$ and $b = -5$ _____
24. $a^2 + b^2$ when $a = -2$ and $b = 3$ _____

D. Talk algebra

25. How many terms are in $5x^2 - 3x + 7$? _____
26. What is the coefficient of x in $5x^2 - 3x + 7$? _____
27. What is the constant term in $5x^2 - 3x + 7$? _____
28. Write $y \times y \times y$ the short way. _____
29. Seán says $2x + 3y = 5xy$. Is he right? Explain. _____
30. Which is a like term to $4ab$: $4a$, $7ba$, ab^2, $4b$? _____

Questions 31–34 are on the next page.

EXAM-STYLE · THEN CHECK

Exam corner + answers

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E. Exam-style questions (show your work)

31. Simplify (a) $6x - 2y + 3x + 5y$ (b) $3n^2 + 2n - n^2 - 7n + 4$

32. $p = -3$ and $q = 2$. Find the value of (a) $2p + 5q$ (b) $p^2 - q$ (c) $pq - q^2$

33. A gym charges a €30 joining fee plus €12 a month. (a) Write an expression for the cost, in euro, of m months. (b) Find the cost of one year. (c) Another gym charges €15 a month with no joining fee. Which gym is cheaper for one year?

34. A triangle has sides $x + 4$, $2x - 1$ and $3x$ cm. (a) Write the perimeter in its simplest form. (b) Find the perimeter when $x = 5$. (c) How long is the longest side when $x = 5$?

Answers

A	1. $8x$ · 2. $6a$ · 3. $3x + 5y$ · 4. $2m + 3n$ · 5. $5p + 4$ · 6. $3x^2 + 3x$ · 7. $2ab + 3a$ · 8. $2t + 6$
B	9. $n + 7$ · 10. $x - 4$ · 11. $6n$ · 12. $2y + 9$ · 13. $p/2$ · 14. $10 - t$ · 15. $2n + 5$ · 16. $8x + 4$
C	17. 13 · 18. −3 · 19. 22 · 20. 25 · 21. 18 · 22. −12 · 23. 7 · 24. 13
D	25. 3 · 26. −3 · 27. 7 · 28. y^3 · 29. No: 2x and 3y are not like terms, so 2x + 3y can't be simplified · 30. 7ba
E	31. (a) **$9x + 3y$** (b) **$2n^2 - 5n + 4$** · 32. (a) $-6 + 10 =$ **4** (b) $9 - 2 =$ **7** (c) $-6 - 4 =$ **−10** · 33. (a) **$12m + 30$** (b) $12(12) + 30 =$ **€174** (c) €15 × 12 = €180, so the **first gym** is cheaper · 34. (a) **$6x + 3$** cm (b) $6(5) + 3 =$ **33 cm** (c) the sides are 9, 9 and 15: **15 cm**

Got one wrong? Check: did each term keep the sign in front of it? Did you only add like terms (same letters, same powers)? Did you put negative numbers in brackets and square before multiplying? Did "less than" start with the letter? Then play **Like-Term Sweep** at leim.ie/like-term-sweep.html: the "Go back over these" list at the end shows the rule for each mistake.

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