JUNIOR CYCLE MATHS · FREE REVISION SHEET

Integers & the order of operations

↗ Léim

Learning outcomes (2018 specification): N.1a, N.1b, N.1c, U.1, U.2. Play the game: **leim.ie/integer-rush.html**

1. Spot the pattern

$3 \times (-2) = -6 \cdot 2 \times (-2) = -4 \cdot 1 \times (-2) = -2 \cdot 0 \times (-2) = 0 \cdot -1 \times (-2) =$ **?**

Each answer goes up by 2, so the next one is **+2**. That's why a negative × a negative is **positive**.

2. The number line

Integers ($\mathbb{Z}$) are ... −3, −2, −1, 0, 1, 2, 3 ...
Numbers get **bigger to the right**, so −2 > −8 (−2 °C is warmer than −8 °C).

3. Adding and subtracting

Add a positive → hop right	−5 + 8 = 3
Subtract a positive → hop left	2 − 7 = −5
− − side by side → **+**	4 − (−3) = 4 + 3 = 7
+ − side by side → **−**	6 + (−9) = 6 − 9 = −3
Both negative: add, keep the −	−4 − 6 = −10

4. Multiplying and dividing

Signs	Answer
Same (+ +, or − −)	**positive**: (−6) × (−3) = 18
Different (+ −)	**negative**: 20 ÷ (−4) = −5

Lots of numbers? Count the minus signs: even → +, odd → −. (−2) × (−3) × (−1) = −6.

Squares: $(-4)^2 = (-4) \times (-4) =$ **16**.

Watch out: these rules are for × and ÷. (−3) + (−5) = **−8**, not 8.

5. BIMDAS: the order of operations

Brackets	(2 + 3) × 4 = 5 × 4 = 20	**I**ndices	$2 \times 3^2 = 2 \times 9 = 18$
M D × ÷ left to right	12 ÷ 3 × 2 = 4 × 2 = 8	**A S** + − left to right	10 − 4 + 3 = 9

2 + 3 × 4 = 2 + 12 = **14** (not 20). **Laws:** commutative (7 + 2 = 2 + 7, 4 × 5 = 5 × 4) · associative ((2 × 5) × 9 = 2 × (5 × 9)) · distributive (3 × (40 + 2) = 3 × 40 + 3 × 2 = 126).

Exam tip: integers are inside almost every question on the paper. Show every step (examiners give part marks for correct work), put negatives in brackets when you substitute ($(-3)^2 = 9$), and check your answer makes sense.

PRACTICE · 34 QUESTIONS

Have a go

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A. The number line

1. Put in order, smallest first: 4, −7, 0, −2, 9, −10 _____
2. Which is bigger, −3 or −8? _____
3. Write < or >: −5 ___ −1 _____
4. Start at −4 and hop 7 to the right. Where do you land? _____
5. Start at 2 and hop 6 to the left. Where do you land? _____
6. What number is halfway between −6 and 2? _____

B. Add and subtract

7. −6 + 9 = _____
8. 4 − 11 = _____
9. −3 − 5 = _____
10. 7 + (−10) = _____
11. −2 − (−8) = _____
12. −12 + 4 = _____
13. 5 − (−6) = _____
14. −9 + (−3) = _____

C. Multiply and divide

15. (−4) × 6 = _____
16. (−7) × (−3) = _____
17. −36 ÷ 9 = _____
18. (−48) ÷ (−6) = _____
19. 8 × (−5) = _____
20. (−2) × (−3) × (−5) = _____
21. $(-6)^2$ = _____
22. −45 ÷ (−5) = _____

D. BIMDAS (show each step)

23. 3 + 5 × 2 = _____
24. (3 + 5) × 2 = _____
25. 20 − 12 ÷ 4 = _____
26. 4×3^2 = _____
27. 18 ÷ 6 × 3 = _____
28. 10 − (7 − 2) = _____
29. 6 + 4 × (−3) = _____
30. $(-2)^2 + 3 \times (-4)$ = _____

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. At 7 a.m. it was −5 °C in Cavan. By 2 p.m. it was 6 °C. By how many degrees did the temperature rise?

32. Seán has €35 in his bank account. He spends €52. What is his balance now?

33. Find the value of $3x^2 - 2x$ when $x = -4$.

34. Put brackets into 2 + 4 × 6 − 1 to make the answer 35.

Answers

A	1. −10, −7, −2, 0, 4, 9 · 2. −3 · 3. −5 < −1 · 4. 3 · 5. −4 · 6. −2
B	7. 3 · 8. −7 · 9. −8 · 10. −3 · 11. 6 · 12. −8 · 13. 11 · 14. −12
C	15. −24 · 16. 21 · 17. −4 · 18. 8 · 19. −40 · 20. −30 · 21. 36 · 22. 9
D	23. 3 + 10 = 13 · 24. 8 × 2 = 16 · 25. 20 − 3 = 17 · 26. 4 × 9 = 36 · 27. 3 × 3 = 9 · 28. 10 − 5 = 5 · 29. 6 + (−12) = −6 · 30. 4 + (−12) = −8
E	31. 6 − (−5) = 11 degrees · 32. 35 − 52 = −€17 (overdrawn by €17) · 33. 3(16) − 2(−4) = 48 + 8 = 56 · 34. (2 + 4) × 6 − 1 = 35

Got one wrong? Find the slip: a sign (− − is +), the order (× before +), or a square ($(-6)^2 = 36$). Then play **Integer Rush** at leim.ie/integer-rush.html: the "Go back over these" list at the end shows the rule for each mistake.

All questions written by Léim. Léim is independent and not connected with the State Examinations Commission or the NCCA.