Unit 1 · Algebraic Expressions and Integers Cheat Sheet

Unit 1 focus: place value, variables, expressions and the order of operations

1 KEY VOCABULARY

variable	A letter that stands for a number.	n in n + 7
algebraic expression	Numbers, variables and operations, no equals sign.	3x − 5
integer	A whole number or its opposite.	−8, 0, 15
absolute value	Distance from 0.	|−6| = 6
opposites	Same distance from 0, opposite sides.	7 and −7

2 ORDER OF OPERATIONS

Grouping, exponents, multiply/divide left to right, add/subtract left to right.

Example: $20 - 3 \cdot 4 + 6 \div 2$
Multiply, divide: 12 and 3
Left to right: 20 − 12 + 3

Answer: 11

3 EVALUATING EXPRESSIONS

Substitute, then simplify in order.

Example: Evaluate 4a − b for a = 3, b = −2.
Substitute: 4(3) − (−2) = 12 + 2

Answer: 14

4 WORDS TO EXPRESSIONS

7 less than a number	**n − 7**
the product of 5 and a number	**5n**
a number divided by 3, plus 2	$\frac{n}{3} + 2$
twice the sum of x and 4	**2(x + 4)**

5 ROUNDING AND ESTIMATING

Problem	Estimate
4,872 rounded to the nearest hundred	4,900
398 + 512	400 + 500 = 900
61 × 19	60 × 20 = 1,200

Look at the digit to the right of the place you round to: 5 or more rounds up.

6 QUICK REMINDERS & COMMON MISTAKES

✔ Do remember

- Multiply and divide before adding and subtracting.
- A variable can stand for any number.
- Estimate first, then check your exact answer against it.

✘ Common mistakes

- 20 − 3 · 4 = 68: multiply first: 8
- |−6| = −6: 6
- “7 less than n” = 7 − n: n − 7

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More practice: integer operations, estimation, patterns and the coordinate plane

1 ADDING AND SUBTRACTING INTEGERS

Rule	Example
Same signs: add, keep the sign	$-5 + (-3) = -8$
Different signs: subtract, take the sign of the larger absolute value	$-9 + 4 = -5$
Subtracting: add the opposite	$6 - (-2) = 6 + 2 = 8$

2 MULTIPLYING AND DIVIDING INTEGERS

Signs	Result
same signs	positive: $(-4)(-5) = 20$
different signs	negative: $-24 \div 6 = -4$
even number of negatives	positive
odd number of negatives	negative

3 MIXED INTEGER PROBLEM

Use the order of operations with integer rules.

Example: $-3(4-9)+(-12)\div 4$
Parentheses: $-3(-5) = 15$
Divide: $-12 \div 4 = -3$

Answer: 12

4 PATTERNS AND INDUCTIVE REASONING

Find the rule from the examples, then extend it.

Example: Next two terms: 3, 7, 11, 15, ...
Rule: add 4

Answer: 19, 23

5 THE COORDINATE PLANE

Quadrant	Signs
I	(+, +)
II	(−, +)
III	(−, −)
IV	(+, −)

Start at the origin: move along x first, then y.

6 CHECK YOURSELF

- Did I follow the order of operations?
- Did I do the same thing to both sides?
- Did I check my answer in the original problem?
- Does my answer have the right sign and units?