

## 0.1 Integers & Signs

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### Integers & Signs

Chapter 0 — Absolute Foundations

*Show all work. Slow down on negative signs. When you feel stuck, rewrite subtraction as “add the opposite.”*

Name: \_\_\_\_\_ Date: \_\_\_\_\_

#### Key Ideas — Integers & Signs

- **Integers** are whole numbers and their opposites:  $\dots, -3, -2, -1, 0, 1, 2, 3, \dots$
- **Opposites:**  $a$  and  $-a$  are opposites. Example: the opposite of 7 is  $-7$ .
- **Absolute value:**  $|a|$  is the distance from 0. Always nonnegative.
- **Subtracting:**  $a - b = a + (-b)$  (subtracting is adding the opposite).
- **Sign rules:**
  - $(-)(-) = (+)$  and  $(+)(-) = (-)$  and  $(-)(+) = (-)$
  - Same signs  $\Rightarrow$  add magnitudes and keep the sign.
  - Different signs  $\Rightarrow$  subtract magnitudes and keep the sign of the larger magnitude.

- **Distributing negatives:**

$$-(a + b) = -a - b \quad \text{and} \quad -(a - b) = -a + b.$$

#### Quick Examples (read, then try the practice)

**Example 1.** Rewrite subtraction as addition:

$$6 - (-4) = 6 + 4 = 10.$$

**Example 2.** Different signs (subtract magnitudes):

$$-12 + 5 = -(12 - 5) = -7.$$

**Example 3.** Distribute a negative:

$$-(3x - 8) = -3x + 8.$$

**Example 4.** Combine like terms carefully:

$$-2x + 7x - (x - 5) = 5x - x + 5 = 4x + 5.$$

## Practice A — Integer Operations

Compute. (No calculators.)

1.  $7 + (-3) =$

2.  $-8 + (-6) =$

3.  $-15 + 9 =$

4.  $12 - 19 =$

5.  $-4 - 11 =$

6.  $-13 - (-5) =$

7.  $18 - (-7) =$

8.  $(-6)(-5) =$

9.  $(9)(-4) =$

10.  $\frac{-42}{6} =$

11.  $\frac{-36}{-9} =$

12.  $|-17| =$

## Practice B — Decode the Signs

Rewrite each expression to make the signs clearer, then simplify.

1.  $10 - (-3) + (-2)$

2.  $-5 - (-8) - 4$

3.  $-12 + 6 - (-9)$

4.  $3 - 7 + (-11)$

5.  $-20 - (-6) + 2$

6.  $-1 - (-1) - (-1)$

## Practice C — Distribute with Negatives

Distribute. Then simplify.

1.  $-(x + 9)$

2.  $-(4x - 7)$

3.  $-3(2x - 5)$

4.  $2 - (x - 6)$

5.  $-(2x + 3y)$

6.  $-(a - b + c)$

7.  $-5(3m + 2) - (-4m)$

## Practice D — Simplify Expressions

Simplify completely.

1.  $-7x + 3x$

2.  $8y - (3y - 5)$

3.  $-(2x - 3) + (x - 10)$

4.  $4a - 2(a - 6)$

5.  $-3(2p - 1) + 5p$

6.  $6 - 2(4 - x)$

## Challenge (optional)

Take your time. Check your signs.

1. Simplify:  $-(2x - 5) - (3x + 4) + 9$

2. Simplify:  $-(4 - (2y - 7))$

3. Simplify:  $3(-(x - 2)) - 2(x - 6)$

4. A number is  $-8$  units from  $0$ . What are the possible numbers? Explain.