

BIG IDEAS MATH  
Course 3 (Common Core)  
California Edition

# Foundations Review

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**Dedication.** For Lizbeth. You are smart, brilliant, and capable of anything you set your mind to. Please remember to take breaks, drink water, and get some fresh air, eat good yums, mimis, and take your time.

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# Chapter 0

## Absolute Foundations

### 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: \_\_\_\_\_

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#### 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.

## 0.2 Order of Operations

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### Order of Operations

Chapter 0 — Absolute Foundations

*Show all work. Rewrite subtraction as “add the opposite” when helpful. Use parentheses to keep your steps organized.*

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

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#### Key Idea — Order of Operations (PEMDAS)

**Always do operations in this order:**

1. **P**arentheses (grouping symbols)
2. **E**xponents
3. **M**ultiplication and **D**ivision *from left to right*
4. **A**ddition and **S**ubtraction *from left to right*

**Important:** Multiplication and division are a *pair* (same priority). Addition and subtraction are a *pair* (same priority).

### Common Mistakes to Avoid

- Doing addition before multiplication. Example:  $3 + 2 \cdot 5$  is  $3 + 10 = 13$ , not  $(3 + 2) \cdot 5$ .
- Forgetting left-to-right for  $\div$  and  $\times$ . Example:  $24 \div 3 \cdot 2$  is  $(24 \div 3) \cdot 2 = 16$ .
- Losing negative signs. Rewrite subtraction as addition:  $a - b = a + (-b)$ .
- Forgetting parentheses after a minus sign:  $-(x - 7) = -x + 7$ .

### Worked Examples (follow the order)

**Example 1.** Evaluate:  $6 + 3 \cdot 4$

$$6 + 3 \cdot 4 = 6 + 12 = 18.$$

**Example 2.** Evaluate:  $24 \div 3 \cdot 2$

$$24 \div 3 \cdot 2 = (24 \div 3) \cdot 2 = 8 \cdot 2 = 16.$$

**Example 3.** Evaluate:  $-(5 - 12) + 3^2$

$$-(5 - 12) + 3^2 = -(-7) + 9 = 7 + 9 = 16.$$

**Example 4.** Simplify:  $2(3x - (x - 4))$

$$2(3x - (x - 4)) = 2(3x - x + 4) = 2(2x + 4) = 4x + 8.$$

**Mini-check.** Evaluate:  $10 - 2 \cdot (3 + 1) \Rightarrow$  \_\_\_\_\_

## Practice A — Evaluate (Warm-Up)

Evaluate.

1.  $8 + 2 \cdot 6$

2.  $30 - 5 \cdot 4$

3.  $18 \div 3 + 7$

4.  $4^2 - 3 \cdot 5$

5.  $12 \div 2 \cdot 3$

6.  $36 \div (6 \cdot 3)$

7.  $7(5 - 2) + 1$

8.  $9 - (2 + 4)^2$

## Practice B — Parentheses & Negatives

Evaluate.

1.  $-(8 - 13) + 6$

2.  $-3(2 - 7)$

3.  $5 - (3 - 9)$

4.  $2(4 - (1 - 6))$

5.  $-2^3 + 10$

6.  $(-2)^3 + 10$

## Practice C — Simplify (Variables)

Simplify completely.

1.  $3x + 2x \cdot 4$

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

3.  $4(x + 2) - 3(x - 5)$

4.  $2(3x - (x - 7))$

5.  $6 - 2(4 - x)$

6.  $-(2x - 3) + 5(x - 1)$

## Challenge (optional)

Take your time. Organize with parentheses.

1. Evaluate:  $48 \div 6 \cdot 2 + 3^2$

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



3. Explain in one sentence why  $24 \div 3 \cdot 2 \neq 24 \div (3 \cdot 2)$ .

## 0.3 Distributive Property

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### Distributive Property

Chapter 0 — Absolute Foundations

*Directions: Show all work. Distribute to **every** term inside parentheses.*

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

#### Key Idea — Distributive Property

**Distribute (multiply) to every term inside the parentheses.**

**Form:**  $a(b + c) = ab + ac$  and  $a(b - c) = ab - ac$ .

**Helpful memory:** *Whatever is outside the parentheses gets multiplied by each term inside.*

#### Common Mistakes to Avoid

- **Forgetting a term:**  $3(x + 5)$  must become  $3x + 15$  (not just  $3x + 5$ ).
- **Sign mistakes:**  $-2(x - 4) = -2x + 8$ .
- **Parentheses matter:**  $-(x - 7) = -x + 7$ .
- **Combining unlike terms too early:** Distribute first, then simplify.

### Worked Examples (Follow the Steps)

**Example 1.** Expand:  $4(x + 3)$

$$4(x + 3) = 4 \cdot x + 4 \cdot 3 = 4x + 12.$$

**Example 2.** Expand:  $-3(2x - 5)$

$$-3(2x - 5) = (-3) \cdot 2x + (-3) \cdot (-5) = -6x + 15.$$

**Example 3.** Expand and simplify:  $2(x + 4) + 3(x - 1)$

$$2(x + 4) + 3(x - 1) = (2x + 8) + (3x - 3) = 5x + 5.$$

**Example 4.** Factor using the distributive property (reverse direction):  $6x + 18$

$$6x + 18 = 6(x + 3).$$

**Your turn (mini-check).** Expand:  $-(x + 9) \Rightarrow$  \_\_\_\_\_

## Practice A — Distribute (Warm-Up)

Expand. (Distribute to *every* term.)

1.  $3(x + 7)$

2.  $5(x - 2)$

3.  $-4(x + 6)$

4.  $2(3x + 1)$

5.  $-7(2x - 5)$

6.  $\frac{1}{2}(8x - 10)$

## Practice B — Distribute with Negatives and Parentheses

Expand and simplify.

1.  $-(x - 8)$

2.  $-(2x + 3)$

3.  $-2(x - 9)$

4.  $-3(4x + 2)$

5.  $2 - (x - 5)$

6.  $7 - (2x + 1)$

## Practice C — Combine Like Terms After Distributing

Expand, then simplify completely.

1.  $2(x + 5) + x$

2.  $3(x - 4) + 2x$

3.  $4(x + 1) - 2(x - 3)$

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

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

6.  $5(x - 3) - 2(3x - 7)$

### **Practice D — Factor (Distribute Backwards)**

Factor out the greatest common factor (GCF).

1.  $8x + 24$

2.  $15x - 10$

3.  $12x + 18$

4.  $9x - 27$

5.  $14x + 21$

6.  $6x - 42$

### **Practice E — Spot the Distributive Property**

For each, circle the part where the distributive property is used, then write the simplified result.

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

2.  $10(0.3x + 0.7)$

3.  $2(5 + x)$

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

### Challenge (Optional)

These are a bit harder — try your best.

1. Find  $x$  if  $3(x - 2) = 2x + 7$ .

2. Simplify:  $2(3x - (x - 4))$ .

## 0.4 Mixed Foundations Review

# Chapter 1

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