BIG IDEAS MATH

Course 3 (Common Core)

California Edition

Foundations Review

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Quick Links

Latest version & replication files | **Textbook (Online Access)**

Basic Skills Handbook | **Skills Review Handbook**

Multi-Language Glossary | **Glossary Flashcards (PDF)**

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

← Contents ✓ Solutions

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: $\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots$
- **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:**

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

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. $\dfrac{-42}{6} =$

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

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: $-\big(4 - (2y - 7)\big)$

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

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

0.2 Order of Operations

← Contents ✓ Solutions

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:** _____

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: $2\big(3x - (x - 4)\big)$

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

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. $-3\big(2-7\big)$

3. $5-\big(3-9\big)$

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

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. $2\big(3x - (x - 7)\big)$

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

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

Challenge (optional)

Take your time. Organize with parentheses.

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

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

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

0.3 Distributive Property

← Contents ✓ Solutions

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: $2\big(3x - (x - 4)\big)$.

0.4 Mixed Foundations Review

← Contents ✓ Solutions

Mixed Foundations Review

Chapter 0 — Absolute Foundations

Show all work. Use PEMDAS. Rewrite subtraction as "add the opposite." Distribute to ***every*** *term. Keep track of negative signs carefully.*

Name: _____ **Date:** _____

Skills This Review Mixes

- **Integers & signs:** adding/subtracting negatives; multiplying/dividing signs; rewriting subtraction.
- **Distributive property:** $a(b+c) = ab + ac$ and $-(b-c) = -b + c$.
- **Order of operations:** parentheses, exponents, multiply/divide left to right, add/subtract left to right.
- **Simplify & solve:** combine like terms, then isolate the variable.

Part A — Evaluate & Simplify (Warm-Up)

Evaluate or simplify.

1. $8 - 3 \cdot (5 - 7)$

2. $-12 + 4 \cdot 3 - 6$

3. $24 \div 3 \cdot 2 - 5$

4. $-(6-14)+2^3$

5. $-3\big(2-(5-9)\big)$

6. $5-\big(3-(2-7)\big)$

7. -2^3+10

8. $(-2)^3+10$

Part B — Distribute, Then Combine Like Terms

Simplify completely.

1. $-(x+7)+3x$

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

3. $-(4x-9)-2(\,x+3\,)$

4. $5-3\big(2x-1\big)$

5. $-2\big(3y-8\big)+(y-5)$

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

7. $-\big(2m-3n+4\big)+2(m+n)$

Part C — Solve Equations (Watch the Signs)

Solve for the variable. Check by substitution when you can.

1. $x - 9 = -4$

2. $-7 = x + 3$

3. $-3x = 24$

4. $\dfrac{x}{-6} = -5$

5. $2x - 5 = 11$

6. $-4x + 9 = -19$

7. $3(x - 4) = -18$

8. $-2(\,x + 7\,) = 10$

9. $5 - (x - 3) = -4$

10. $2\big(3x-1\big)-4=8$

Part D — Multi-Step (All Skills Together)

Simplify first, then solve.

1. $3 - \big(2x - 7\big) = 10$

2. $-\big(4x - 5\big) + 2x = 13$

3. $2\big(x - 6\big) - 3\big(x + 1\big) = -8$

4. $5\big(2x - 3\big) + 4 = 3\big(3x + 2\big)$

5. $\frac{1}{2}(\,6x - 8\,) - (x - 3) = 5$

Challenge (optional)

These are harder. Take your time and write neat steps.

1. A student earns \$12 per hour. They worked 5 hours, but had a \$8 fee taken out. Write and evaluate an expression for their pay.

2. The temperature was $-3°$F. Overnight it dropped 7 degrees, then rose 5 degrees. What is the final temperature?

3. Solve and interpret: $-2(\,x-4\,)+3=17$. (What number makes the equation true?)

4. True or false? Explain: $-(a-b)=-a-b$.

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Appendix B

Worked Examples