Unit 1: Numerical Expressions & Factors — The Backcountry Trail Crew & Maker Cabin

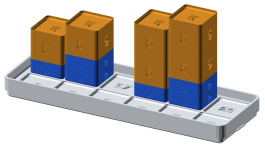
Whole Number Operations, Powers & Exponents, Order of Operations, Prime Factorization, GCF & LCM

Every summer in the Cascade Mountains, a group of sixth-grade volunteers helps the ranger station prepare backcountry campsites, wildlife observation blinds, and a small maker cabin. Maya signed up to organize the supply crates and battery banks, even though she secretly worried she would mess up the counts and leave a trail crew short on gear miles from the nearest road. Across the cabin, Leo tinkers with mountain bikes, solar signboards, and LEGO robotics prototypes, while Zoe hikes with the field biologists to watch Clark's nutcrackers hide thousands of pine seeds for the winter.

During their first week, guessing got all three of them into trouble. When Maya tried to pack 53 lithium battery cells into 6-cell drone packs, her phone calculator gave her a long decimal that didn't tell her how many real packs she could actually clip into a drone. When 78 campers showed up at the lake for 4-person canoes, Leo wasn't sure whether to round up or down so nobody got left on the dock. And when Sam and Leo added up the cost of a skateboard deck plus four wheels, they got two completely different totals from the exact same numbers.

In the bike and robotics shed, Leo noticed another puzzle: two gears with spiky teeth only mesh smoothly when their tooth counts share common building blocks, and two park shuttles leaving the trailhead on different schedules only meet up at the station when their loop times hit a shared multiple. Even Zoe's field notes on periodical cicadas that emerge every 12 or 15 years followed the exact same pattern.

None of them felt like 'math people' at the start of the summer. But by working out each supply puzzle by hand first and then checking their answers on their SC-6 calculators, they discovered that whole numbers have built-in patterns for leftovers, rapid doubling, grouping rules, and repeating cycles—turning messy real-world guesses into plans they could trust.



Real-World Mathematical Context & Two-Method Mastery • Hands-On Models: Place Value & Prime Factor Blocks

UNIT 1 LESSONS — LEARN TWO TEXTBOOK WAYS FIRST, THEN CHECK YOUR WORK ON THE SC-6 CALCULATOR

SEC 1.1 (pp.4-5) Whole Number Operations & Division with Remainders

Textbook Ways: Way 1: Standard Long Division | Way 2: Partial Quotients | Way 3: Equal-Groups Array Model

Learn by Hand: In Big Ideas Math, whole-number division splits a dividend into equal groups of the divisor: Dividend = (Quotient × Divisor) + Remainder, where the remainder is always less than the divisor. Modeling the dividend on the Place Value Tray physically separates the equal groups (Quotient) from the leftover ones (Remainder).

Check Your Work on the SC-6 Calculator:

[2] [3] [ENTER] [4] [g] [÷R]

Type 23 [ENTER] 4 [g][÷R]. Read the Remainder (3) on line Y and the Quotient (5) on line X! Press [f][LASTx] [×] [+] to verify 5 × 4 + 3 = 23.

SEC 1.2 (pp.6-7) Powers and Exponents

Textbook Ways: Way 1: Multiply Step-by-Step | Way 2: Group Factors in Pairs | Way 3: Square & Cube Array Model

Learn by Hand: A power represents repeated multiplication of the same factor. In b^n, the base b is the repeated factor and the exponent n tells how many times the base is used as a factor. In the Prime Factor Towers, stacking n identical prime blocks models b^n directly (for example, three [2] blocks build $2^3 = 8$, and four [2] blocks build $4^2 = 2^4 = 16$).

Check Your Work on the SC-6 Calculator:

[4] [x^2] [4] [x^3]

Press 4 [x^2] to verify $4^2 = 16$, and press 4 [x^3] to verify $4^3 = 64$.

SEC 1.3 (pp.8-9) Order of Operations

Textbook Ways: Way 1: PEMDAS Step-by-Step Funnel | Way 2: Distributive Property / Fraction-Bar Grouping

Learn by Hand: Big Ideas Order of Operations (PEMDAS): (1) Evaluate expressions inside grouping symbols (), [], or fraction bars first; (2) Evaluate powers; (3) Multiply and divide from left to right; (4) Add and subtract from left to right.

Check Your Work on the SC-6 Calculator:

[8] [ENTER] [4] [+] [9] [ENTER] [3] [-] [×]

Follow PEMDAS on paper first. To check (8 + 4) × (9 - 3) on your SC-6, solve the first parentheses with 8 [ENTER] 4 [+] (12 waits on Y), solve the second with 9 [ENTER] 3 [-] (6 on X), and press [×] to confirm 72!

SEC 1.4 (pp.10-11) Prime Factorization

Textbook Ways: Way 1: Factor Tree (Pair A) | Way 2: Factor Tree (Pair B) | Way 3: Division Ladder

Learn by Hand: In Big Ideas Math, a Factor Tree or Division Ladder splits a composite number until every branch ends at a prime number. In the Prime Factor Towers, block heights are logarithmic, so stacking [2]+[2]+[3]+[5] always reaches the exact 60 mark whether you split 60 as 6 × 10 or 4 × 15.

Check Your Work on the SC-6 Calculator:

[6] [0] [g] [人]

Build your factor tree for 60 by hand until every branch ends at a prime. On your SC-6, test any branch with [PRIME] (flashes YES/NO) and type 60 [g][FACT] to verify the prime factorization $2^2 \times 3 \times 5$!

SEC 1.5 (pp.12-13) Greatest Common Factor (GCF) & Least Common Multiple (LCM)

Textbook Ways: Way 1: List Factors & Multiples | Way 2: Prime Factorization | Way 3: Prime Factor Venn Diagram

Learn by Hand: In Big Ideas Math, a Prime Factor Venn Diagram places shared prime factors in the center overlap and remaining primes in the outer circles: multiplying the center overlap gives the GCF, and multiplying all regions together gives the LCM! Placing Prime Factor Blocks into the Venn circles makes the shared overlap and union visible.

Check Your Work on the SC-6 Calculator:

[2] [0] [ENTER] [5] [0] [GCF] [2] [0] [ENTER] [5] [0] [f] [LCM]

Press 20 [ENTER] 50 [GCF] to confirm GCF = 10, and 20 [ENTER] 50 [f][LCM] to confirm LCM = 100 (or [f][C.FAC] for shared primes).

HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 1.1 — Practice A: Whole Number Operations & Division with Remainders

Key Vocabulary: dividend • divisor • quotient • remainder

Name: _____ Date: _____ Score: ____ / 100

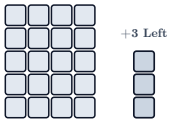
TEXTBOOK CONCEPT & HANDS-ON MODEL (PLACE VALUE BLOCKS)

Way 1: Long Division (23 ÷ 4)

```
   5  R 3
4 | 23
   -20      (5×4)
    3       (Rem < 4)
```

Check: (5 × 4) + 3 = 23

Equal-Groups Array: 5 Rows of 4 + 3



5 Full Groups (20) Rem = 3

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Concept: Divide Dividend ÷ Divisor to find the Quotient (full equal groups) and Remainder (leftover < Divisor).

Textbook Check: Always verify division with the Division Algorithm: (Quotient × Divisor) + Remainder = Dividend.

WATCH OUT: A remainder must ALWAYS be smaller than the divisor (Rem < Divisor). Check whether the problem asks for full groups, leftovers, or rounding up!

WORKED EXAMPLE — 3 TEXTBOOK WAYS (ANY 2 WAYS = +20 PTS)

Problem: Divide 23 ÷ 4 and check your answer using the Division Algorithm.

WAY 1: Standard Long Division
Divide 23 by 4: 4 goes into 23 five times (5 × 4 = 20). Subtract 23 - 20 = 3 → Quotient 5 R 3.

WAY 2: Partial Quotients (Subtract Multiples)
Split 23 into friendly multiples of 4: take 3 × 4 = 12 (leaves 11), then 2 × 4 = 8 (leaves 3) → (3 + 2) = 5 R 3.

WAY 3: Equal-Groups Array Model (With Blocks)
Arrange 23 tiles into rows of 4: you form 5 full rows of 4 (20 tiles) with 3 leftover tiles → 5 R 3. (Check: 5×4+3 = 23.)

Answer: 5 R 3 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.1 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

2 3 ENTER 4 g ÷R

Solve 23 ÷ 4 on paper first. Then check on your SC-6:
Type 23 [ENTER] 4 [g][÷R]. Read the Remainder (3) on line Y and the Quotient (5) on line X! Press [f][LASTx] [×] [+] to verify 5 × 4 + 3 = 23.

SECTION 1.1 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Divide 31 ÷ 6.**
Starter Step 1: Divide 31 ÷ 6 to find how many full groups of 6 fit inside 31, then check (Quotient × 6) + Remainder = 31.

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Divide 47 ÷ 5.**
Starter Step 1: Find the largest multiple of 5 that is ≤ 47, then subtract it from 47 to find the remainder.

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Divide 58 ÷ 7 and check your answer by multiplying.**

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Divide 85 ÷ 9. How many full groups of 9 can be made, and how many are left over?**

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Divide 146 ÷ 12.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Paracord Strap Cuts: Maya cuts 35 cm straps from a 250 cm roll of paracord. How many full lines can be cut, and how many centimeters of cord remain?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **When a number is divided by 8, the quotient is 14 and the remainder is 5. What is the number?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Error Analysis: Sam says 75 ÷ 8 = 8 R 11. Explain why a remainder of 11 is impossible and find the correct answer.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **LEGO Rover Wheels: Leo has a bin of 78 rover tires. Each rover requires 4 tires. How many complete 4-wheel rovers can be built, and how many tires are left in spares?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Wilderness Tent Expedition: 29 explorers are setting up 4-person tents for a storm. How many tents must they pitch so every explorer has shelter?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 1.1 — Practice B: Modeling Real Life (Whole Number Operations & Division with Remainders)

Textbook Ways: Standard Long Division | Partial Quotients | Equal-Groups Array Model Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — INTERPRETING THE REMAINDER (3 TEXTBOOK WAYS • ANY 2 = +20 PTS)

Problem: A robotics tournament has 135 students riding in vans that hold 8 students each. How many vans are needed so every student has a seat?

WAY 1: Standard Long Division
Divide 135 ÷ 8: 8 into 13 is 1 (13 - 8 = 5); bring down 5 → 8 into 55 is 6 (55 - 48 = 7) → 16 R 7.

WAY 2: Partial Quotients (10 Vans + 6 Vans)
Subtract 10 vans (10 × 8 = 80 students, leaving 55), then 6 vans (6 × 8 = 48, leaving 7) → 16 full vans + 7 students.

WAY 3: Interpret the Remainder in Context
16 vans hold 128 students, leaving 7 students waiting. Add 1 more van for the remaining 7 students → 17 vans total.

WATCH OUT: A remainder must ALWAYS be smaller than the divisor (Rem < Divisor). Check whether the problem asks for full groups, leftovers, or rounding up!

Answer: 17 vans (16 full vans + 1 van with 7 students)

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.1 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

1 3 5 ENTER 8 g ÷R f LAST x × +

Work out 135 ÷ 8 by hand first, then press 135 [ENTER] 8 [g][÷R] on your SC-6. Line X shows 16 full vans and line Y shows 7 leftover students—confirming you must round up to 17 vans! Press [f][LASTx] [×] [+] to check 16 × 8 + 7 = 135.

At the ranger station, Maya stared at a bin of 53 lithium battery cells and felt her stomach sink. Each drone pack needed 6 cells, and when she typed 53 ÷ 6 into a phone calculator, it spat out 8.8333333—which made no sense at all when you are holding real metal batteries that cannot be cut into pieces. For a moment she worried she wasn't cut out to be supply quartermaster. Then she tried lining the batteries up in rows of 6 on the workbench and realized the messy decimal was hiding a simple whole-number remainder: 8 full rows of 6 use 48 cells, leaving 5 spare cells on the table. And when 78 campers arrived for 4-person canoes that afternoon, she saw that the same remainder meant 19 full canoes wouldn't be enough—they needed a 20th canoe so the last 2 campers wouldn't be left behind.

SECTION 1.1 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Drone Battery Packs: A robotics team has 53 lithium cells. Each drone battery pack requires 6 cells. How many full battery packs can the team build, and how many cells are left over?**

Starter Step 1: Divide 53 cells ÷ 6 cells per pack: the quotient is full packs and the remainder is leftover cells.

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Arcade Prize Tickets: You win 94 tickets and trade them for mini-figures that cost 8 tickets each. How many mini-figures can you get, and how many tickets remain?**

Starter Step 1: Divide 94 tickets ÷ 8 tickets per figure: the quotient is mini-figures and the remainder is leftover tickets.

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Camp Canoe Fleet: 78 campers are crossing a lake in canoes that hold 4 campers each. How many canoes are needed so every camper has a seat?**

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Cookie Bakery Tray: A baker places 110 warm cookies onto cooling racks that hold 12 cookies per rack. How many racks are completely filled, and how many cookies go on the last rack?**

Way 1 (Paper Work):

Q:___ R:___

Check: (___ × ___) + ___ = ___

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **3D Printer Spool: A filament spool has 450 meters of PLA. Each chess knight uses 16 meters. How many complete knights can be printed, and how much PLA is left over?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Nutcracker Seed Caches: A Clark's nutcracker hides 165 pine seeds in underground caches of 9 seeds each and remembers every cache months later! How many caches are full, and how many does it dig in all?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Mystery Marble Bags: When a bag of marbles is packed into pouches of 15, there are 12 full pouches and 7 marbles left over. How many marbles were in the bag to start?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Theme Park Coaster: A roller coaster train holds 24 riders. There are 200 people in line. How many full trains run, and how many riders are on the final train?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Pizza Party Slices: Each large pizza is cut into 8 slices. If 67 students each eat 1 slice, how many whole pizzas must the school order, and how many slices will be left over?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Apple Orchard Crates: An orchard harvests 325 apples and packs them into crates that hold 28 apples each. How many full crates are packed, and how many apples are left over?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

HANDS-ON MODEL: PRIME FACTOR TOWERS

Section 1.2 — Practice A: Powers and Exponents

Key Vocabulary: power • base • exponent • perfect square • perfect cube

Name: _____ Date: _____ Score: ____ / 100

TEXTBOOK CONCEPT & HANDS-ON MODEL (PRIME FACTOR TOWERS)

Power: Base × Base (Repeated Factor)

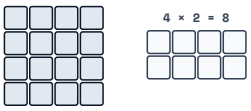
Exponent (2 factors)

$4^2 = 4 \times 4 = 16$

Base

Watch Out: $4^2 = 16$ (NEVER $4 \times 2 = 8$!)

Prime & Square Model: 4^2 (16) vs. 4×2 (8)



$4^2 = 4 \times 4 = 16$

(Not a Square!)

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Concept: In b^n, the base b is the repeated factor and the exponent n counts how many times b is multiplied.
Textbook Watch-Out: 4^2 means $4 \times 4 = 16$ (a 4-by-4 perfect square), NEVER base × exponent ($4 \times 2 = 8$)!
WATCH OUT: 4^3 means $4 \times 4 \times 4 = 64$ — NEVER multiply the base by the exponent ($4 \times 3 = 12$)!

WORKED EXAMPLE — 3 TEXTBOOK WAYS (ANY 2 WAYS = +20 PTS)

Problem: Write 4^2 and 4^3 as repeated multiplication and find their values. Compare 4^2 to 4×2.

WAY 1: Multiply Step-by-Step Left to Right
Write the base 4 as a repeated factor: $4^2 = 4 \times 4 = 16$. For 4^3: $4 \times 4 = 16$, then $16 \times 4 = 64$.

WAY 2: Square Area & Cube Volume Model (With Blocks)
4^2 is the area of a 4×4 square (16 square units), and 4^3 is the volume of a $4 \times 4 \times 4$ cube (64 cubic units).

WAY 3: Decompose into Smaller Powers
Use the previous power: since $4^1 = 4$, $4^2 = 4 \times 4^1 = 16$, and $4^3 = 4 \times 4^2 = 4 \times 16 = 64$.

Answer: $4^2 = 16$, $4^3 = 64$ 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.2 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

4 [x^2] 4 [x^3]

Write out the repeated multiplication by hand first. Then check on your SC-6:
Press 4 [x^2] to verify $4^2 = 16$, and press 4 [x^3] to verify $4^3 = 64$.

SECTION 1.2 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Write 5^2 as repeated multiplication and find its value.**
Starter Step 1: Write the base 5 two times (5×5) and multiply (never multiply base × exponent!).

Way 1 (Paper Work):

Expand: ___ × ___ × ___
Value = _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Evaluate 7^2 and compare its value to 7×2.**
Starter Step 1: Compute $7^2 = 7 \times 7$ first, then compute 7×2 so you can compare the square to the product.

Way 1 (Paper Work):

Expand: ___ × ___ × ___
Value = _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Write 3^3 as repeated multiplication and find its value.**

Way 1 (Paper Work):

Expand: ___ × ___ × ___
Value = _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Evaluate 5^3.**

Way 1 (Paper Work):

Expand: ___ × ___ × ___
Value = _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Write 2^5 as repeated multiplication and find its value.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Evaluate 6^4.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Evaluate 10^4 and 1^4. How does the exponent relate to the number of zeros in a power of 10?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Error Analysis: Mia wrote $2^4 = 8$ because $2 \times 4 = 8$. Describe and correct her error.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Rope Pulley Multiplier: Each stage of a treehouse pulley doubles a crew's pulling force. With 5 stages, the multiplier is 2^5. If a crew pulls with 3 kN of force, what total force does the hoist lift?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Modular Storage Cubes: A camp gear station is assembled from cubic rooms measuring 2 m on each edge. What is the volume of 1 cubic room, and of 8 rooms?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

Section 1.2 — Practice B: Modeling Real Life (Powers and Exponents)

Textbook Ways: Multiply Step-by-Step | Group Factors in Pairs | Square & Cube Array Model Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — DOUBLING & TRIPLING GROWTH (3 TEXTBOOK WAYS • ANY 2 = +20 PTS)

Problem: A video clip is shared by 3 friends in Round 1, and the number of shares triples in each round. How many shares happen in Round 4?

WAY 1: Multiply Step-by-Step (Left to Right)
Write 3^4 as four factors of 3: $3 \times 3 = 9 \rightarrow 9 \times 3 = 27 \rightarrow 27 \times 3 = 81$ shares.

WAY 2: Group Factors in Pairs (Associative Property)
Pair the four factors of 3 into two squares: $(3 \times 3) \times (3 \times 3) = 9 \times 9 = 81$ shares.

WAY 3: Pattern of Powers Table
Track each round in a table: Round 1 = 3, Round 2 = 9, Round 3 = 27, Round 4 = 81 shares.

WATCH OUT: 4^3 means $4 \times 4 \times 4 = 64$ — NEVER multiply the base by the exponent ($4 \times 3 = 12$)!

Answer: 81 shares

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.2 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

3 ENTER 4 g y^x

Calculate 3^4 on paper first. To check any power b^n on your SC-6, type the base 3 [ENTER], type the exponent 4, and press [g][y^x] to confirm 81.

Leo was ready to give up when his biology lab sheet asked how many bacteria there would be after a single cell split in two every hour for 6 hours. He started drawing tiny branching lines on scratch paper, lost count around thirty, and muttered that he always messed up big numbers. Sitting next to him, Maya pointed out that every hour just multiplied the count by 2 again—just like his 8-by-8 LED matrix multiplied 8×8 for a square and his 6-by-6-by-6 storage crate multiplied $6 \times 6 \times 6$ for a cube. Once Leo saw that an exponent simply counts how many times a number multiplies by itself ($2^6 = 64$), a whole page of messy scribbles shrank into one step he could actually trust.

SECTION 1.2 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Pixel Art Canvas: A retro game sprite is drawn on an 8-by-8 square grid. Write the total number of pixels as a power and find its value.**

Starter Step 1: An 8-by-8 square grid has $8^2 = 8 \times 8$ pixels—multiply the side length by itself.

Way 1 (Paper Work):

Expand: ___ × ___ = ___

Value = _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Cubic Storage Room: You dig a cubic room measuring 6 blocks long, 6 blocks wide, and 6 blocks tall. How many blocks do you mine in all?**

Starter Step 1: A 6-by-6-by-6 cube has volume $6^3 = 6 \times 6 \times 6$ blocks—multiply the first two 6s, then multiply by the third 6.

Way 1 (Paper Work):

Expand: ___ × ___ = ___

Value = _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Cell Division Biology Lab: A single bacterium splits into 2 bacteria every hour. How many bacteria are there after 6 hours?**

Way 1 (Paper Work):

Expand: ___ × ___ = ___

Value = _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Tournament Bracket: A tennis tournament has 4^4 players in the opening round. Write 4^4 as repeated multiplication and find how many players entered.**

Way 1 (Paper Work):

Expand: ___ × ___ = ___

Value = _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Patio & Grill Pad: A patio has a 12 ft by 12 ft square main deck and a 5 ft by 5 ft square grill pad. What is the combined area of both squares?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Starling Flock Expansion: On call 1, 5 starlings alert 5 neighbors each. Each wave multiplies by 5. How many starlings are alerted on wave 4?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Perfect Square Garden: A square community garden has an area of 196 square meters. What is the side length of the garden?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Power Showdown: Which is greater, 2^5 or 5^2? By how much?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Binary Memory Kilobyte: One kilobyte in binary computer memory is 2^{10} bytes. How many bytes are in one kilobyte?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Sculpture Pedestal: A sculptor stacks a 3-inch cube on top of a 7-inch cube. What is the combined volume of the two cubes?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

TEXTBOOK MODEL: PAPER / GRAPH / FORMULA

Section 1.3 — Practice A: Order of Operations

Key Vocabulary: numerical expression • evaluate • order of operations • grouping symbols

Name: _____ Date: _____ Score: ____ / 100

TEXTBOOK CONCEPT & VISUAL DIAGRAM

Textbook PEMDAS Funnel: (8 + 4) × (9 - 3)

(8 + 4) × (9 - 3)
= 12 × (9 - 3) [1st ( )]
= 12 × 6 [2nd ( )]
Way 2: 8(6) + 4(6) = 48 + 24
= 72

PEMDAS Priority Checklist

1. ( ) [ ] Grouping Symbols
2. b^n Exponents / Powers
3. × and ÷ Left → Right (Equal!)
4. + and - Left → Right (Equal!)

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Concept (PEMDAS): 1. Grouping Symbols ( ) [ ] 2. Exponents 3. Multiply & Divide (Left → Right) 4. Add & Subtract (Left → Right).

Textbook Watch-Out: Multiplication and division have EQUAL priority (go Left to Right); addition and subtraction also go Left to Right!

WATCH OUT: Multiply & Divide have EQUAL priority (go Left-to-Right!), and Add & Subtract have EQUAL priority (go Left-to-Right!).

WORKED EXAMPLE — 2 TEXTBOOK WAYS FOR DOUBLE POINTS (+20)

Problem: Evaluate (8 + 4) × (9 - 3).

WAY 1: Standard Order of Operations (PEMDAS Funnel)

Evaluate inside both sets of parentheses first: (8 + 4) = 12 and (9 - 3) = 6. Then multiply: 12 × 6 = 72.

WAY 2: Distributive Property Expansion

Simplify (9 - 3) = 6 first, then distribute 6 across (8 + 4): (8 × 6) + (4 × 6) = 48 + 24 = 72.

Answer: 72 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.3 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

8 ENTER 4 + 9 ENTER 3 - ×

Follow PEMDAS on paper first. To check (8 + 4) × (9 - 3) on your SC-6, solve the first parentheses with 8 [ENTER] 4 [+] (12 waits on Y), solve the second with 9 [ENTER] 3 [-] (6 on X), and press [×] to confirm 72!

SECTION 1.3 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 Evaluate $5 + 2 \times 3$.

Starter Step 1: By PEMDAS, multiply 2 × 3 FIRST before adding 5: 5 + (2 × 3).

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-
= _____
= _____
= _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

2 Evaluate $(14 + 6) \div (7 - 2)$.

Starter Step 1: Evaluate both parentheses first—(14 + 6) and (7 - 2)—and then divide the first result by the second.

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-
= _____
= _____
= _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

3 Evaluate $30 - 4 \times 6$.

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-
= _____
= _____
= _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

4 Evaluate $(9 + 3) \times (15 - 8)$.

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-
= _____
= _____
= _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

5 Evaluate $50 - (3 + 4)^2$.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

6 Evaluate $120 - 4 \times (3 + 2)^2$.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

7 Evaluate the fraction-bar expression $(48 - 4 \times 6) / (3 + 2 \times 4.5)$.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

8 Evaluate $3^3 + 15 \div 3 - 2 \times 4$.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

9 Claw-Bot Robotics Kit: A team orders 5 high-torque servos at $12 each and 4 bumper sensors at $8 each. What is the total cost of the parts?

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

10 3D-Printed Mini-Drone Fundraiser: A maker club sells 45 mini-drone frames at $2 each and subtracts $28 for PLA filament spools. What is the club's net profit?

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

TEXTBOOK MODEL: PAPER / GRAPH / FORMULA

Section 1.3 — Practice B: Modeling Real Life (Order of Operations)

Textbook Ways: PEMDAS Step-by-Step Funnel | Distributive Property / Fraction-Bar Grouping Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — MULTI-STEP NUMERICAL EXPRESSION (2 TEXTBOOK WAYS = +20 PTS DOUBLE)

Problem: Evaluate $40 - 3 \times (2 + 3)^2 \div 5$.

WAY 1: Standard PEMDAS Funnel (Left-to-Right Multiply/Divide)

1. Parentheses: $(2+3) = 5$. 2. Exponent: $5^2 = 25$. 3. Multiply then Divide L-to-R: $3 \times 25 = 75$, then $75 \div 5 = 15$. 4. Subtract: $40 - 15 = 25$.

WAY 2: Write Division as a Fraction Term

Rewrite $3 \times 5^2 \div 5$ as the fraction $(3 \times 25) / 5$. Divide $25 \div 5 = 5$ first, multiply $3 \times 5 = 15$, then subtract: $40 - 15 = 25$.

Watch-Out: Never subtract 40 - 3 first! Multiplication and division come before subtraction.

WATCH OUT: Multiply & Divide have EQUAL priority (go Left-to-Right!), and Add & Subtract have EQUAL priority (go Left-to-Right!).

Answer: 25

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.3 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

`4` `0` `ENTER` `3` `ENTER` `2` `ENTER` `3` `+` `x²` `×` `5` `÷` `-`

Work from the inside out on paper, then check on your SC-6 stack:
Type 40 [ENTER] 3 [ENTER] 2 [ENTER] 3 [+] [x^2] [×] 5 [÷] [-]—the 4-line stack holds each intermediate result without parentheses keys and confirms 25!

Sam and Leo both worked out the price of a $45 skateboard deck plus 4 wheels at $7 each, but Sam got $343 while Leo got $73. Sam was ready to crumple up his paper, convinced that math rules like PEMDAS were just made up to trick kids who aren't fast at arithmetic. Then Leo set the actual parts on the counter: one wooden deck and a plastic pack of four $7 wheels. Looking at the table, Sam suddenly saw what had happened—when he added $45 + 4$ first and multiplied by 7, he was pretending he bought 49 items at $7 each! Calculating the 4-wheel bundle ($4 \times \$7 = \$28$) before adding the $45 deck wasn't a random school rule after all; it matched how the parts really sit on the workbench.

SECTION 1.3 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Movie Night Snack Combo: Four friends each buy a $9 movie ticket and a $5 tub of popcorn. Write and evaluate an expression for the total cost.**

Starter Step 1: Group 1 friend's combo in parentheses: $4 \times (\$9 + \$5)$, or use the Distributive Property: $4(\$9) + 4(\$5)$.

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-

= _____

= _____

= _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Skateboard Build: You buy a $45 skateboard deck and 4 wheels at $7 each. What is the total cost of the parts?**

Starter Step 1: Multiply the 4 wheels × $7 FIRST, then add the $45 deck: $45 + (4 × $7).

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-

= _____

= _____

= _____

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Laser Tag Score: You start with 100 points, lose 8 points on each of 3 penalties, and then win a 25-point bonus. What is your final score?**

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-

= _____

= _____

= _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Tile Border Courtyard: A 10 m by 10 m square courtyard has a 6 m by 6 m square fountain in the center. What is the area of the surrounding tile walkway?**

Way 1 (Paper Work):

PEMDAS Funnel: ( ) → b^n → ×/÷ → +/-

= _____

= _____

= _____

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Aquarium Ticket Group: Admission to an aquarium is $14 for adults and $9 for children. How much does admission cost for 2 adults and 5 children?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Raven Puzzle Boxes: A raven solves 6 puzzle boxes. Each box awards 3^2 points for pulling a pin plus 5 points for sliding a latch, minus a 14-point time penalty total. Find the raven's final score.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Craft Fair Booth: You make 72 bracelets, keep 12 for friends, and pack the rest equally into 6 display boxes. How many bracelets go into each box?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Evaluate $48 \div 6 \times 4 + 10$. Explain why division is performed before multiplication in this expression.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Bakery Muffin Boxes: A baker makes 5 trays of 12 blueberry muffins and 3 trays of 8 banana muffins, then packs all of them equally into 7 gift baskets. How many muffins are in each basket?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Evaluate $(4^3 - 14) \div (2 + 3) + 8^2$.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

HANDS-ON MODEL: PRIME FACTOR TOWERS

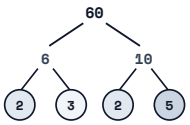
Section 1.4 — Practice A: Prime Factorization

Key Vocabulary: factor pair • prime number • composite number • prime factorization • factor tree

Name: _____ Date: _____ Score: ____ / 100

TEXTBOOK CONCEPT & HANDS-ON MODEL (PRIME FACTOR TOWERS)

Way 1: Factor Tree



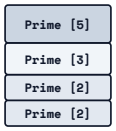
Circle prime leaves!

Way 2: Division Ladder

2 | 60
2 | 30
3 | 15
5 (Prime!)

60 = $2^2 \times 3 \times 5$

Way 3: Prime Blocks



Tower = 2·2·3·5 = 60

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Method 1 (Factor Tree): Branch a composite number into any factor pair until every leaf at the bottom is prime.

Textbook Method 2 (Division Ladder): Divide repeatedly by the smallest prime factors (2, 3, 5, ...) until the quotient is prime.

WATCH OUT: Keep branching until EVERY bottom leaf is PRIME (do not stop at composite numbers like 4, 6, 8, or 9; and remember 1 is NOT prime).

WORKED EXAMPLE — 3 TEXTBOOK WAYS (ANY 2 WAYS = +20 PTS)

Problem: Write the prime factorization of 60 using exponents.

WAY 1: Factor Tree Starting with 6 × 10

Branch 60 → 6 × 10. Split 6 → 2 × 3 and 10 → 2 × 5. Circle the prime leaves: $2 \times 2 \times 3 \times 5 = 2^2 \times 3 \times 5$.

WAY 2: Factor Tree Starting with 4 × 15

Branch 60 → 4 × 15. Split 4 → 2 × 2 and 15 → 3 × 5. Same prime leaves (and same prime blocks): $2^2 \times 3 \times 5$.

WAY 3: Division Ladder (Repeated Prime Division)

Divide by smallest primes step-by-step: 60 ÷ 2 = 30 → 30 ÷ 2 = 15 → 15 ÷ 3 = 5 (prime) → $2^2 \times 3 \times 5$.

Answer: 60 = $2^2 \times 3 \times 5$

1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.4 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

6 0 g [FACT]

Build your factor tree for 60 by hand until every branch ends at a prime. On your SC-6, test any branch with [PRIME] (flashes YES/NO) and type 60 [g][FACT] to verify the prime factorization $2^2 \times 3 \times 5$!

SECTION 1.4 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 Write the prime factorization of 12 using exponents.

Starter Step 1: Branch 12 into two factors (such as 2 × 6 or 3 × 4), keep branching until all leaves are prime, and write with exponents.

Way 1 (Paper Work):

Factor Tree

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

2 Write the prime factorization of 36 using exponents.

Starter Step 1: Branch 36 into two factors (such as 6 × 6), then branch each factor until only prime numbers remain.

Way 1 (Paper Work):

Factor Tree

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

3 Determine whether 29 and 91 are prime or composite. If composite, write the prime factorization.

Way 1 (Paper Work):

Factor Tree

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

4 Write the prime factorization of 45.

Way 1 (Paper Work):

Factor Tree

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

5 Two Factor Trees: Write the prime factorization of 72 using two different factor trees (starting with 8 × 9 and 6 × 12).

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

6 Write the prime factorization of 84.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

7 Find the prime factorization of 210.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

8 Write the prime factorization of 504 using exponents.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

9 Arabian Nights Mystery Number: Factor 1,001 into its three prime factors.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

10 Base-60 Ancient Astronomer Number: There are 3,600 seconds in 1 hour. Write the prime factorization of 3,600 using exponents.

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) Ans: _____

Section 1.4 — Practice B: Modeling Real Life (Prime Factorization)

Textbook Ways: Factor Tree (Pair A) | Factor Tree (Pair B) | Division Ladder Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — MARCHING BAND FORMATIONS (3 TEXTBOOK WAYS • ANY 2 = +20 PTS)

Problem: A marching band has 120 musicians. Write the prime factorization of 120 and find two different rectangular row formations.

WAY 1: Factor Tree (12 × 10)
Split $120 = 12 \times 10 \rightarrow (4 \times 3) \times (2 \times 5) \rightarrow (2 \times 2 \times 3) \times (2 \times 5) = 2^3 \times 3 \times 5$.

WAY 2: Division Ladder by Smallest Primes
$120 \div 2 = 60 \rightarrow 60 \div 2 = 30 \rightarrow 30 \div 2 = 15 \rightarrow 15 \div 3 = 5 \rightarrow 2^3 \times 3 \times 5$.

WAY 3: Regroup Prime Blocks into Factor Pairs
Group [2][2][2][3][5] in two ways: $(2^3) \times (3 \times 5) = 8$ rows of 15, or $(2 \times 5) \times (2^2 \times 3) = 10$ rows of 12.

WATCH OUT: Keep branching until EVERY bottom leaf is PRIME (do not stop at composite numbers like 4, 6, 8, or 9; and remember 1 is NOT prime).

Answer: $2^3 \times 3 \times 5$ (e.g., 8 × 15 or 10 × 12)

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.4 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

[2] [x^3] [3] [×] [5] [×]

To check the whole number built from $2^3 \times 3 \times 5$ on your SC-6, press 2 [x^3] 3 [×] 5 [×] to confirm 120 (then press [g][FACT] to see its prime factors or [f][C.FAC] to compare two numbers).

When Maya tried to arrange 48 small solar cells into a neat rectangle on the cabin roof, she kept losing track of which row widths worked evenly and which ones left awkward gaps, while a spare batch of 37 cells wouldn't form any rectangle at all except one long, skinny line. She doubted she could ever find every possible layout without guessing all afternoon. Then Leo showed her how to branch 48 down a factor tree until only prime numbers ($2 \times 2 \times 2 \times 2 \times 3$) remained at the tips. Even when Maya started her tree with 6×8 and Leo started with 4×12, both trees ended at the exact same prime building blocks—giving her a foolproof way to see every factor pair inside a number.

SECTION 1.4 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Solar Panel Grid: A satellite wing has 48 solar cells. List all factor pairs of 48 and write its prime factorization using exponents.**

Starter Step 1: Test divisors 1, 2, 3, 4, and 6 to list all factor pairs of 48, then build a factor tree to find its prime factorization.

Way 1 (Paper Work):

Factor Tree

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Drumline Formation: A drumline has 54 musicians. Write the prime factorization of 54.**

Starter Step 1: Divide 54 by the smallest prime (2), then keep branching the remaining factor into prime numbers.

Way 1 (Paper Work):

Factor Tree

WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Prime Jersey Check: Three players wear jersey numbers 37, 51, and 61. Which jersey number is composite, and what is its prime factorization?**

Way 1 (Paper Work):

Factor Tree

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Mineral Display Case: A museum case holds 80 mineral specimens. Write the prime factorization of 80.**

Way 1 (Paper Work):

Factor Tree

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Mystery Composite Number: What whole number has the prime factorization $2 \times 3^2 \times 7$?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Century Mark: Write the prime factorization of 100 using exponents.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Songbird Brain Cells: Crows and parrots pack 140 million neurons into a single gram of brain tissue—denser than primates! Write the prime factorization of 140.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Gross of Pencils: A gross is 144 pencils (12 dozen). Write the prime factorization of 144 using exponents.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Two Factor Trees: Draw two different factor trees for 90—one starting with 9×10 and one starting with 6×15. How do their prime leaves compare?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Primorial Number: What is the smallest whole number that has the first four prime numbers as factors?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

HANDS-ON MODEL: PRIME FACTOR TOWERS

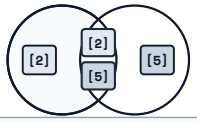
Section 1.5 — Practice A: Greatest Common Factor (GCF) & Least Common Multiple (LCM)

Key Vocabulary: common factor • greatest common factor (GCF) • common multiple • least common multiple (LCM) • Venn diagram

Name: _____ Date: _____ Score: ____ / 100

TEXTBOOK CONCEPT & HANDS-ON MODEL (PRIME FACTOR TOWERS)

Prime Factor Venn Diagram with Blocks (20 = 2·2·5 and 50 = 2·5·5)



Overlap = GCF: 2 × 5 = 10 | All Blocks = LCM: 2 × 2 × 5 × 5 = 100

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Method 1 (Lists): List all factor pairs to find the Greatest Common Factor (GCF); list multiples to find the Least Common Multiple (LCM).

Textbook Method 2 (Prime Venn Diagram): Overlap primes = GCF; union of all regions (highest power of each prime) = LCM.

WATCH OUT: GCF is a factor that divides IN (smaller or equal, Venn overlap); LCM is a multiple they build UP to (larger or equal, all Venn blocks).

WORKED EXAMPLE — 3 TEXTBOOK WAYS (ANY 2 WAYS = +20 PTS)

Problem: Find the greatest common factor (GCF) and least common multiple (LCM) of 20 and 50.

WAY 1: List Factors (for GCF) & Multiples (for LCM)
Factors of 20: 1, 2, 4, 5, 10, 20; of 50: 1, 2, 5, 10, 25, 50 → GCF = 10. Multiples: 20, 40, 60, 80, 100 & 50, 100 → LCM = 100.

WAY 2: Prime Factorization Powers
$20 = 2^2 \times 5$ and $50 = 2 \times 5^2$. Shared prime factors = $2 \times 5 = 10$ (GCF). Highest power of each prime = $2^2 \times 5^2 = 100$ (LCM).

WAY 3: Prime Factor Venn Diagram (With Blocks)
Left circle only: [2]. Center overlap: [2] and [5] → GCF = 2×5 = 10. Right circle only: [5]. All regions: 2×10×5 = 100 (LCM).

Answer: GCF = 10, LCM = 100 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.5 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

2 0 ENTER 5 0 GCF 2 0 ENTER 5 0 f LCM

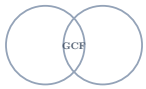
Find the GCF and LCM of 20 and 50 on paper first. Then check on your SC-6:
Press 20 [ENTER] 50 [GCF] to confirm GCF = 10, and 20 [ENTER] 50 [f][LCM] to confirm LCM = 100 (or [f][C.FAC] for shared primes).

SECTION 1.5 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **Find the GCF and LCM of 12 and 18.**
Starter Step 1: Factor 12 and 18 into prime numbers; multiply the shared overlap primes for GCF, and all Venn primes for LCM.

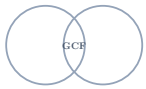
Way 1 (Paper Work):



WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Find the GCF and LCM of 8 and 12.**
Starter Step 1: List all factors of 8 and 12 to find the GCF, then count up by multiples of 12 to find the LCM.

Way 1 (Paper Work):



WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Find the GCF and LCM of 15 and 25.**

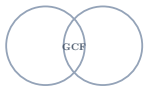
Way 1 (Paper Work):



CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Find the GCF and LCM of 14 and 35.**

Way 1 (Paper Work):



CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Trail Crew Snack Packs: Maya has 48 granola bars and 72 fruit leather strips to pack into identical trail-snack pouches with none left over. What is the greatest number of identical pouches she can make?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Field Trip Snack Bags: You have 84 cheddar crackers and 140 pretzel sticks to pack into identical snack bags for a hike with none left over. What is the greatest number of identical snack bags you can make?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Find the GCF and LCM of 45 and 75.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Park Shuttle Cycle: The North Trail shuttle completes a loop every 15 minutes and the South Trail shuttle every 20 minutes. If they leave the station together, in how many minutes will they meet at the station again?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Municipal Traffic Signals: Along an avenue, the North-South green light cycles every 45 seconds and the pedestrian walk signal cycles every 60 seconds. If both trigger together now, how many seconds pass before they trigger together again?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **Robotics Part Bags: Leo has 36 red LEGO Technic axles and 48 blue connector pins to pack into identical team kit bags with none left over. What is the greatest number of kit bags he can make, and how many of each part go into each bag?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

HANDS-ON MODEL: PRIME FACTOR TOWERS

Section 1.5 — Practice B: Modeling Real Life (Greatest Common Factor (GCF) & Least Common Multiple (LCM))

Textbook Ways: List Factors & Multiples | Prime Factorization | Prime Factor Venn Diagram Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — IDENTICAL SNACK PACKS (3 TEXTBOOK WAYS • ANY 2 = +20 PTS)

Problem: You have 18 pretzel bags and 24 fruit bars to make identical snack packs with none left over. What is the greatest number of packs you can make?

WAY 1: List All Factors of 18 and 24
Factors of 18: 1, 2, 3, 6, 9, 18. Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24. Greatest common factor = 6 packs.

WAY 2: Prime Factor Venn Diagram
$18 = 2 \times 3 \times 3$ and $24 = 2 \times 2 \times 2 \times 3$. Center overlap has [2] and [3] → GCF $= 2 \times 3 = 6$ packs (left has 3 pretzels; right has 4 bars).

WAY 3: Common Prime Division Ladder
Divide (18, 24) by 2 → (9, 12); divide by 3 → (3, 4). Product of side divisors $= 2 \times 3 = 6$ packs (with 3 and 4 inside).

WATCH OUT: GCF is a factor that divides IN (smaller or equal, Venn overlap); LCM is a multiple they build UP to (larger or equal, all Venn blocks).

Answer: 6 packs (3 pretzels and 4 fruit bars per pack)

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 1.5 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

[1] [8] [ENTER] [2] [4] [GCF] [1] [8] [ENTER] [2] [4] [f] [LCM]

After solving by hand, press 18 [ENTER] 24 [GCF] on your SC-6 to verify 6 identical snack packs (and press 18 [ENTER] 24 [f][LCM] to confirm 72 when checking repeating cycles).

Leo used to dread word problems with GCF and LCM because the two three-letter names sounded almost identical, and he always guessed the wrong one on quizzes. While helping pack 28 bandages and 42 antiseptic wipes into identical trail first-aid kits, he paused and asked himself what the physical objects were actually doing. Splitting supplies into smaller equal bags with zero leftovers meant dividing IN to find the biggest shared building block—the Greatest Common Factor (14 kits). Later, watching two camp shuttles on 18-minute and 24-minute loops and two meshing 14-tooth and 21-tooth LEGO gears, he realized repeating cycles build UP into the future until they meet at the Least Common Multiple.

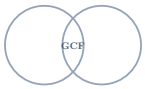
SECTION 1.5 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

100-PT GOAL: Any 5 in 2 Ways (+20) OR All 10 in 1 Way (+10)!

1 **First-Aid Kits: A school nurse has 28 bandages and 42 antiseptic wipes to pack into identical first-aid kits with none left over. What is the greatest number of kits she can make?**

Starter Step 1: 'Greatest number of identical kits' means GCF—find the Greatest Common Factor of 28 bandages and 42 wipes.

Way 1 (Paper Work):

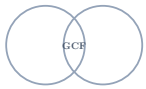


WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

2 **Periodical Insect Cycles: Insect Species A emerges every 12 years and Species B peaks every 15 years. If both peak together this year, in how many years will they next peak together?**

Starter Step 1: 'Next peak together' means LCM—find the Least Common Multiple of the 12-year and 15-year cycles.

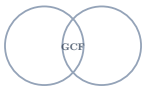
Way 1 (Paper Work):



WARM-UP • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

3 **Cookout Packages: Hot dogs come in packs of 8 and buns come in packs of 12. What is the least number of hot dogs and buns you can buy to have an equal number of each?**

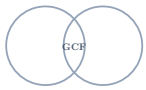
Way 1 (Paper Work):



CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

4 **Choir Riser Rows: The 6th-grade choir has 32 altos and 48 sopranos. Each row must have the same number of singers and only one voice part. What is the greatest number of singers that can be placed in each row?**

Way 1 (Paper Work):



CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

5 **Bus Station Loop: Route A returns to the station every 18 minutes and Route B returns every 24 minutes. Both leave at 9:00 AM. At what time will both buses next be at the station together?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

6 **Square Quilt Patches: You have a sheet of fabric 36 inches wide by 60 inches long and want to cut it into the largest possible equal squares with no fabric left over. What is the side length of each square?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

7 **Meshing LEGO Gears: As a 14-tooth gear and a 21-tooth gear turn together, their teeth click 1-for-1. (a) What is the largest equal tooth-group size for both gears? (b) How many teeth click past before two marked teeth meet again?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

8 **Triple Track Laps: Three go-karts complete a lap in 4, 6, and 10 minutes. If they start together, after how many minutes will all three cross the start line together again?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CORE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

9 **Balloon Bouquets: You have 45 gold balloons and 75 silver balloons to tie into identical bouquets using all the balloons. What is the greatest number of bouquets you can make, and how many gold balloons go in each?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

10 **GCF & LCM Product Pattern: Find the GCF and LCM of 15 and 20. Compare the product GCF × LCM to the product 15 × 20. What do you notice?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

CHALLENGE • [ ] +10 (1 Way) [ ] +20 (2 Ways) **Ans:** _____

SUMMATIVE QUIZ: 10 ITEMS × 10 PTS = 100

Unit 1 Mastery Quiz: Numerical Expressions & Factors

Directions: Show all paper steps in each box (+6 pts work, +4 pts answer). Name: _____ Date: _____ Score: ____ / 100

ASSESSMENT BREAKDOWN: #1–#6 CORE FLUENCY (60 PTS) • #7–#9 REAL-LIFE APPLICATIONS (30 PTS) • #10 ERROR ANALYSIS (10 PTS)

Standards Assessed: CCSS 6.NS.B.2–4, 6.EE.A.1 • TEKS 6.7A • FL MA.6.NSO.2–3 • UIL Number Sense & MathCounts Prime/GCF/LCM

1 CORE FLUENCY (SEC 1.1) • 10 PTS

Find the whole-number quotient and remainder: $1{,}745 \div 16$.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

2 CORE FLUENCY (SEC 1.1) • 10 PTS

Evaluate the exact multi-digit quotient: $2{,}484 \div 23$.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

3 CORE FLUENCY (SEC 1.2) • 10 PTS

Evaluate the sum of powers: $4^3 + 5^2$.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

4 CORE FLUENCY (SEC 1.3) • 10 PTS

Evaluate using order of operations: $60 - 3 \times (2^3 + 4) \div 2$.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

5 CORE FLUENCY (SEC 1.4) • 10 PTS

Write the prime factorization of 180 using exponents.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

6 CORE FLUENCY (SEC 1.5) • 10 PTS

Find both the GCF and the LCM of 24 and 36.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

7 REAL LIFE (SEC 1.5) • 10 PTS

A florist has 48 red roses and 64 white roses to make identical bouquets with none left over. What is the greatest number of bouquets she can make, and how many red roses are in each?

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

8 REAL LIFE (SEC 1.5) • 10 PTS

Two airport shuttles leave together. Shuttle A returns every 12 minutes and Shuttle B every 18 minutes. In how many minutes will both shuttles next leave together?

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

9 REAL LIFE (SEC 1.3) • 10 PTS

A robotics club buys 4 motor kits for \$18 each and 3 sensor packs for \$12 each, then splits the cost equally among 6 members. How much does each member pay?

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

10 ERROR ANALYSIS (SEC 1.3) • 10 PTS

Alex evaluated $50 - 4 \times 2^3$ by subtracting $50 - 4 = 46$ and writing $2^3 = 6$ to get $46 \times 6 = 276$. Identify both errors and find the true value.

[ ] Work (+6) [ ] Ans (+4) **Ans:** _____

Unit 1: Numerical Expressions & Factors — Practice A & B Complete Key

Big Ideas Math Grade 6 — Chapter 1 • Concept → Blocks (When Applicable: Place Value & Prime Factor Blocks) → Calculator

1. Concept (Stack Approach): Multi-step expressions evaluate from the inside out—holding completed groups on shelf Y while building the next group on X. Every whole number factors uniquely into primes.

2. Blocks (Place Value & Prime): Model division quotients/remainders on the Place Value tray and stack Prime Factor blocks to see exponents (2^3), GCF (overlap), and LCM (union).

3. Calculator (SC-6): Use [g][÷R] to split Remainder (Y) and Quotient (X), [g][FACT] for prime powers, and [GCF]/[f][LCM] to verify Venn diagram results.



SEC 1.1 (pp.4-5): WHOLE NUMBER OPERATIONS & DIVISION WITH REMAINDERS

Methods: W1: Standard Long Division | W2: Partial Quotients | W3: Equal-Groups Array Model

PRACTICE A (p.4): KEY IDEAS (#1-#10) — ExA: 5 R 3		PRACTICE B (p.5): REAL LIFE (#1-#10) — ExB: 17 vans (16 full vans + 1 van with 7 students)	
A1: 5 R 1 (31 ÷ 6 (Q & R)) Check: 31 [ENT] 6 [g][÷R]	**A2: 9 R 2 (47 ÷ 5 (Q & R))** Check: 47 [ENT] 5 [g][÷R]	**B1: 8 full packs, 5 cells left (53 ÷ 6 (Q & R))** Check: 53 [ENT] 6 [g][÷R]	**B2: 11 figures, 6 tickets left (94 ÷ 8 (Q & R))** Check: 94 [ENT] 8 [g][÷R]
A3: 8 R 2 (58 ÷ 7 (Q & R)) Check: 58 [ENT] 7 [g][÷R]	**A4: 9 R 4 (85 ÷ 9 (Q & R))** Check: 85 [ENT] 9 [g][÷R]	**B3: 20 canoes (19 full + 1 with 2 campers) (78 ÷ 4 (Q & R))** Check: 78 [ENT] 4 [g][÷R]	**B4: 9 full racks, 2 on last (110 ÷ 12 (Q & R))** Check: 110 [ENT] 12 [g][÷R]
A5: 12 R 2 (146 ÷ 12 (Q & R)) Check: 146 [ENT] 12 [g][÷R]	**A6: 7 full lines, 5 cm left (250 ÷ 35 (Q & R))** Check: 250 [ENT] 35 [g][÷R]	**B5: 28 knights, 2 m left (450 ÷ 16 (Q & R))** Check: 450 [ENT] 16 [g][÷R]	**B6: 18 full, 19 caches total (165 ÷ 9 (Q & R))** Check: 165 [ENT] 9 [g][÷R]
A7: 117 ((14 × 8) + 5) Check: 14 [ENT] 8 [×] 5 [+]	**A8: 9 R 3 (Rem < 8) (75 ÷ 8 (Q & R))** Check: 75 [ENT] 8 [g][÷R]	**B7: 187 marbles ((12 × 15) + 7)** Check: 12 [ENT] 15 [×] 7 [+]	**B8: 8 full trains, 8 on final (200 ÷ 24 (Q & R))** Check: 200 [ENT] 24 [g][÷R]
A9: 19 rovers, 2 tires left (78 ÷ 4 (Q & R)) Check: 78 [ENT] 4 [g][÷R]	**A10: 8 tents (7 full + 1 for the 29th explorer) (29 ÷ 4 (Q & R))** Check: 29 [ENT] 4 [g][÷R]	**B9: 9 pizzas (5 slices left) (67 ÷ 8 (Q & R))** Check: 67 [ENT] 8 [g][÷R]	**B10: 11 full crates, 17 apples left (325 ÷ 28 (Q & R))** Check: 325 [ENT] 28 [g][÷R]

SEC 1.2 (pp.6-7): POWERS AND EXPONENTS

Methods: W1: Multiply Step-by-Step | W2: Group Factors in Pairs | W3: Square & Cube Array Model

PRACTICE A (p.6): KEY IDEAS (#1-#10) — ExA: $4^2 = 16$, $4^3 = 64$		PRACTICE B (p.7): REAL LIFE (#1-#10) — ExB: 81 shares	
A1: 5 × 5 = 25 (5^2) Check: 5 [x^2]	**A2: 49 (vs. 14) (7^2)** Check: 7 [x^2]	**B1: 8^2 = 64 pixels (8^2)** Check: 8 [x^2]	**B2: 6^3 = 216 blocks (6^3)** Check: 6 [x^3]
A3: 3 × 3 × 3 = 27 (3^3) Check: 3 [x^3]	**A4: 125 (5^3)** Check: 5 [x^3]	**B3: 2^6 = 64 bacteria (2^6)** Check: 2 [ENT] 6 [g][y^x]	**B4: 4 × 4 × 4 × 4 = 256 players (4^4)** Check: 4 [ENT] 4 [g][y^x]
A5: 32 (2^5) Check: 2 [ENT] 5 [g][y^x]	**A6: 1,296 (6^4)** Check: 6 [ENT] 4 [g][y^x]	**B5: 144 + 25 = 169 ft² ($12^2 + 5^2$)** Check: 12 [x^2] 5 [x^2] [+]	**B6: 5^4 = 625 starlings (5^4)** Check: 5 [ENT] 4 [g][y^x]
A7: 10,000 (4 zeros) and 1 (10^4) Check: 10 [ENT] 4 [g][y^x]	**A8: 16 (2×2×2×2 = 16) (2^4)** Check: 2 [ENT] 4 [g][y^x]	**B7: 14 meters (√(196))** Check: 196 [f][√x]	**B8: $2^5 = 32 > 5^2 = 25$ (by 7) (2^5 - 5^2)** Check: 2 [ENT] 5 [g][y^x] 5 [x^2] [-]
A9: 96 kN (3 × 32) (2^5 × 3) Check: 2 [ENT] 5 [g][y^x] 3 [×]	**A10: 8 m³ per room; 64 m³ total (2^3 × 8)** Check: 2 [x^3] 8 [×]	**B9: 1,024 bytes (2^{10})** Check: 2 [ENT] 10 [g][y^x]	**B10: 27 + 343 = 370 in³ ($3^3 + 7^3$)** Check: 3 [x^3] 7 [x^3] [+]

SEC 1.3 (pp.8-9): ORDER OF OPERATIONS

Methods: W1: PEMDAS Step-by-Step Funnel | W2: Distributive Property / Fraction-Bar Grouping

PRACTICE A (p.8): KEY IDEAS (#1-#10) — ExA: 72		PRACTICE B (p.9): REAL LIFE (#1-#10) — ExB: 25	
A1: 11 (5 + (2 × 3)) Check: 5 [ENT] 2 [ENT] 3 [×] [+]	**A2: 4 ((14 + 6) ÷ (7 - 2))** Check: 14 [ENT] 6 [+] 7 [ENT] 2 [-] [÷]	**B1: 4(9 + 5) = $56 ((9 + 5) × 4)** Check: 9 [ENT] 5 [+] 4 [×]	**B2: 45 + 4(7) = $73 (45 + (4 × 7))** Check: 45 [ENT] 4 [ENT] 7 [×] [+]
A3: 6 (30 - (4 × 6)) Check: 30 [ENT] 4 [ENT] 6 [×] [-]	**A4: 84 ((9 + 3) × (15 - 8))** Check: 9 [ENT] 3 [+] 15 [ENT] 8 [-] [×]	**B3: 101 points ((100 - (3 × 8)) + 25)** Check: 100 [ENT] 3 [ENT] 8 [×] [-] 25 [+]	**B4: $10^2 - 6^2$ = 64 m² (10^2 - 6^2)** Check: 10 [x^2] 6 [x^2] [-]
A5: 1 (50 - (3 + 4)²) Check: 50 [ENT] 3 [ENT] 4 [+] [x^2] [-]	**A6: 20 (120 - (4 × (3 + 2)²))** Check: 120 [ENT] 4 [ENT] 3 [ENT] 2 [+] [x^2] [×] [-]	**B5: $73 ((2 × 14) + (5 × 9))** Check: 2 [ENT] 14 [×] 5 [ENT] 9 [×] [+]	**B6: 70 points (((3² + 5) × 6) - 14)** Check: 3 [x^2] 5 [+] 6 [×] 14 [-]
A7: 2 (24 ÷ 12) ((48 - (4 × 6)) ÷ (3 + (2 × 4.5))) Check: 48 [ENT] 4 [ENT] 6 [×] [-] 3 [ENT] 2 [ENT] 4.5 [×] [+] [÷]	**A8: 24 ((3³ + (15 ÷ 3)) - (2 × 4))** Check: 3 [x^3] 15 [ENT] 3 [÷] [+] 2 [ENT] 4 [×] [-]	**B7: 10 bracelets per box ((72 - 12) ÷ 6)** Check: 72 [ENT] 12 [-] 6 [÷]	**B8: 42 (÷ and × go left to right) (((48 ÷ 6) × 4) + 10)** Check: 48 [ENT] 6 [÷] 4 [×] 10 [+]
A9: $92 (60 + 32) ((5 × 12) + (4 × 8)) Check: 5 [ENT] 12 [×] 4 [ENT] 8 [×] [+]	**A10: $62 (90 - 28) ((45 × 2) - 28)** Check: 45 [ENT] 2 [×] 28 [-]	**B9: 12 muffins per basket (((5 × 12) + (3 × 8)) ÷ 7)** Check: 5 [ENT] 12 [×] 3 [ENT] 8 [×] [+] 7 [÷]	**B10: 74 (((4³ - 14) ÷ (2 + 3)) + 8²)** Check: 4 [x^3] 14 [-] 2 [ENT] 3 [+] [÷] 8 [x^2] [+]

SEC 1.4 (pp.10-11): PRIME FACTORIZATION

Methods: W1: Factor Tree (Pair A) | W2: Factor Tree (Pair B) | W3: Division Ladder

PRACTICE A (p.10): KEY IDEAS (#1-#10) — ExA: 60 = $2^2 \times 3 \times 5$		PRACTICE B (p.11): REAL LIFE (#1-#10) — ExB: $2^3 \times 3 \times 5$ (e.g., 8 × 15 or 10 × 12)	
A1: $2^2 \times 3$ (Factors(12)) Check: 12 [g][FACT]	**A2: $2^2 \times 3^2$ (Factors(36))** Check: 36 [g][FACT]	**B1: 1×48, 2×24, 3×16, 4×12, 6×8; $2^4 \times 3$ (Factors(48))** Check: 48 [g][FACT]	**B2: 2×3^3 (Factors(54))** Check: 54 [g][FACT]
A3: 29 is prime; 91 is composite (7 × 13) (Factors(91)) Check: 29 [PRIME], 91 [g][FACT]	**A4: $3^2 \times 5$ (Factors(45))** Check: 45 [g][FACT]	**B3: 51 is composite (3 × 17) (Factors(51))** Check: 51 [g][FACT]	**B4: $2^4 \times 5$ (Factors(80))** Check: 80 [g][FACT]
A5: $2^3 \times 3^2$ (Factors(72)) Check: 72 [g][FACT]	**A6: $2^2 \times 3 \times 7$ (Factors(84))** Check: 84 [g][FACT]	**B5: 126 ((2 × 3^2) × 7)** Check: 2 [ENT] 3 [x^2] [×] 7 [×]	**B6: $2^2 \times 5^2$ (Factors(100))** Check: 100 [g][FACT]
A7: $2 \times 3 \times 5 \times 7$ (Factors(210)) Check: 210 [g][FACT]	**A8: $2^3 \times 3^2 \times 7$ (Factors(504))** Check: 504 [g][FACT]	**B7: $2^2 \times 5 \times 7$ (Factors(140))** Check: 140 [g][FACT]	**B8: $2^4 \times 3^2$ (Factors(144))** Check: 144 [g][FACT]
A9: 7 × 11 × 13 (Factors(1001)) Check: 1001 [g][FACT]	**A10: $2^4 \times 3^2 \times 5^2$ (Factors(3600))** Check: 3600 [g][FACT]	**B9: Both give $2 \times 3^2 \times 5$ (Factors(90))** Check: 90 [g][FACT]	**B10: 2 × 3 × 5 × 7 = 210 (((2 × 3) × 5) × 7)** Check: 2 [ENT] 3 [×] 5 [×] 7 [×]

SEC 1.5 (pp.12-13): GREATEST COMMON FACTOR (GCF) & LEAST COMMON MULTIPLE (LCM)

Methods: W1: List Factors & Multiples | W2: Prime Factorization | W3: Prime Factor Venn Diagram

PRACTICE A (p.12): KEY IDEAS (#1-#10) — ExA: GCF = 10, LCM = 100		PRACTICE B (p.13): REAL LIFE (#1-#10) — ExB: 6 packs (3 pretzels and 4 fruit bars per pack)	
A1: GCF = 6, LCM = 36 (GCF(12, 18); LCM(12, 18)) Check: 12 [ENT] 18 [GCF] / [f][LCM]	**A2: GCF = 4, LCM = 24 (GCF(8, 12); LCM(8, 12))** Check: 8 [ENT] 12 [GCF] / [f][LCM]	**B1: 14 kits (2 bandages, 3 wipes each) (GCF(28, 42))** Check: 28 [ENT] 42 [GCF]	**B2: 60 years (LCM(12, 15))** Check: 12 [ENT] 15 [f][LCM]
A3: GCF = 5, LCM = 75 (GCF(15, 25); LCM(15, 25)) Check: 15 [ENT] 25 [GCF] / [f][LCM]	**A4: GCF = 7, LCM = 70 (GCF(14, 35); LCM(14, 35))** Check: 14 [ENT] 35 [GCF] / [f][LCM]	**B3: 24 (3 packs of hot dogs, 2 packs of buns) (LCM(8, 12))** Check: 8 [ENT] 12 [f][LCM]	**B4: 16 singers per row (GCF(32, 48))** Check: 32 [ENT] 48 [GCF]
A5: 24 (GCF(48, 72)) Check: 48 [ENT] 72 [GCF]	**A6: 28 (GCF(84, 140))** Check: 84 [ENT] 140 [GCF]	**B5: 10:12 AM (72 minutes later) (LCM(18, 24))** Check: 18 [ENT] 24 [f][LCM]	**B6: 12 inches (GCF(36, 60))** Check: 36 [ENT] 60 [GCF]
A7: GCF = 15, LCM = 225 (GCF(45, 75); LCM(45, 75)) Check: 45 [ENT] 75 [GCF] / [f][LCM]	**A8: 60 minutes (LCM(15, 20))** Check: 15 [ENT] 20 [f][LCM]	**B7: GCF = 7, LCM = 42 (LCM(14, 21))** Check: 14 [ENT] 21 [GCF] 14 [ENT] 21 [f][LCM]	**B8: 60 minutes (LCM(LCM(4, 6), 10))** Check: 4 [ENT] 6 [f][LCM] 10 [f][LCM]
A9: 180 seconds (3 minutes) (LCM(45, 60)) Check: 45 [ENT] 60 [f][LCM]	**A10: 12 bags (3 red, 4 blue per bag) (GCF(36, 48))** Check: 36 [ENT] 48 [GCF]	**B9: 15 bouquets (3 gold, 5 silver each) (GCF(45, 75))** Check: 45 [ENT] 75 [GCF]	**B10: GCF=5, LCM=60; 5×60 = 300 = 15×20 (GCF(15, 20) × LCM(15, 20))** Check: 15 [ENT] 20 [GCF] 15 [ENT] 20 [f][LCM] [×]

UNIT 01 MASTERY QUIZ KEY (p.112 • TEKS 6.7A): Q1: 109 R1 Q2: 108 Q3: 89 Q4: 42 Q5: $2^2 \cdot 3^2 \cdot 5$

Quiz Q6–Q10 Answers: Q6: GCF=12, LCM=72 Q7: 16 bouquets (3 red) Q8: 36 min Q9: $18 Q10: 2^3=8 & mult first: 18