UNIT 05 TEACHER CORE LESSON • COMMON CORE / TEKS (EUREKA, ILLUSTRATIVE, ENVISION) (GRADES 3–4 • SC-6)

Multi-Step Word Problems Without Parentheses

Multi-Step Word Problems • Standard: CCSS.MATH.4.OA.A.3

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1. MATHEMATICAL CONCEPT & STACK APPROACH: Evaluate chained arithmetic expressions without parentheses by managing stack register flow.

In a multi-step expression like $(3 \times 4) + (2 \times 5)$, each product is a self-contained quantity that must be evaluated before the two groups can be added. On the 4-level stack, the first product (12) waits safely on Shelf Y while the second product (10) is formed on X, requiring zero parentheses.

2. MODELING WITH BLOCKS & STUDENT PREDICTION

Published Block Kit: Place Value Blocks & 4-Register Stack

Hands-On Setup: Use Place Value unit blocks to represent quantities alongside the 4-line stack display.

Student Prediction (Before Calculator): Problem: (8 - 3) × 2. Predict: 8 - 3 = 5, then 5 × 2 = 10.

3. CALCULATOR EXECUTION (SC-6 KEYCAPS & 4-LEVEL STACK TRACE)

Keystroke Flow: 8 ENTER 3 - 2 ×

Key Pressed	Screen (X)	Internal 4-Level Stack Effect (T, Z, Y, X)
8	8	8 in X
ENTER	8	8 copied to Y
3	3	3 entered into X
-	5	8 - 3 = 5 in X
2	2	Automatic lift! 5 lifts to Y; 2 enters X
×	10	5 × 2 = 10 in X!

4. CONTEXT (Inside-Out Multi-Step Problem Solving & Young Gauss's Pairing Insight) • From Blocks to the Stack (SC-6 Manual) — Ch. 2: The Number Elevator & Ch. 4: Young Gauss's 10-Second Shortcut

In 1786, 9-year-old Carl Friedrich Gauss stunned his teacher by adding 1 through 100 in seconds—grouping the numbers from the outside in into 50 pairs of 101! Whenever we solve a multi-step story problem on paper, we naturally compute the inner group first and hold that intermediate result aside while we set up the next step.

Core Investigation (Student Warm-Up A):

A baker bakes 15 cookies, sells 6 of them, and packs the remaining cookies equally into 3 bags. How many cookies go in each bag?

Teacher Answer Key: 3 cookies per bag ((15 - 6) ÷ 3 = 3).

Automatic Stack Lift & Register Retention

Order of Operations & Stack Lift • Standard: CCSS.MATH.4.OA.A.3

1. FOLLOW-UP EXTENSION CONCEPT, BLOCKS & PREDICTION

Concept & Stack Approach: When an inner operation finishes, its result becomes the starting quantity for the next step. On the stack, that intermediate result automatically lifts to Waiting Shelf Y as soon as the next number is typed—allowing multi-step math like (12 ÷ 4) + 7 to flow continuously from the inside out.

Blocks & Prediction: Observe the 4-line stack screen as values automatically lift into register Y: (12 / 4) + 7. Prediction: 12 / 4 = 3. Entering 7 will lift 3 to Y. 3 + 7 = 10.

2. EXTENSION CALCULATOR SEQUENCE & STACK TRACE

[1] [2] [ENTER] [4] [÷] [7] [+]

Key Pressed	Screen (X)	Internal 4-Level Stack Effect
[1]	1	First digit of 12 enters X
[2]	12	12 in register X
[ENTER]	12	12 copied to Y
[4]	4	4 enters X
[÷]	3	12 / 4 = 3 in X
[7]	7	7 entered: 3 lifts to Y automatically!
[+]	10	3 + 7 = 10!

3. TARGET MISCONCEPTIONS & HANDS-ON BLOCK REMEDIATIONS

Misconception 1: Pressing [ENTER] after an operator (+, −, ×, ÷) before typing the next number in a chained calculation, wasting a stack register.

Hands-On Block Remediation: Demonstrate Automatic Stack Lift: after [18] [ENTER] [6] [−] produces 12, typing [3] automatically lifts 12 to Register Y—no [ENTER] needed before [3] [×]!

Misconception 2: Reversing operand order in subtraction or division (computing $X - Y$ instead of $Y - X$).

Hands-On Block Remediation: Remind students that Register Y is always the starting quantity on top (Row 1) and Register X is the operator's action (Row 0); if entered backward, press [x swap y] before [−] or [÷].

Extension Challenge (Student Warm-Up B):

Evaluate (24 ÷ 6) + 15 by solving the division group first and then adding 15 to that result.

My Paper Answer: _____ **[ ] Verified on SC-6 (Online Key: stackcalc.io/curriculum/answers)**

STUDENT LAB WORKSHEET • UNIT 05 (SC-6)

The 4-Register Stack: Four Operations & Automatic Lift

Name: _____ Date: _____ Class: _____

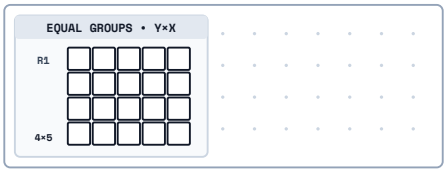
STUDENT REFERENCE GUIDE: 4-REGISTER STACK ANATOMY

- Four registers: T (top), Z (third), Y (second/operand), X (screen/bottom).
- ENTER duplicates X into Y and pushes older values up into Z and T.
- Two-number operators (+, -, ×, ÷) combine Y and X, dropping Z to Y and T to Z.

Key Sequence: `8` `ENTER` `3` `-` `2` `×`

Investigation 1: Solve (14 - 5) × 3 by finding the difference inside the parentheses first, then multiplying by 3.

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

_____

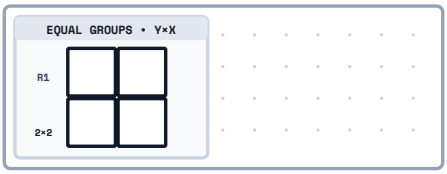
Final Verified Answer:

_____

[ ] Checked on SC-6

Investigation 2: Solve 30 ÷ (2 + 3) by adding the divisor group (2 + 3) first, then dividing 30 by that sum.

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

_____

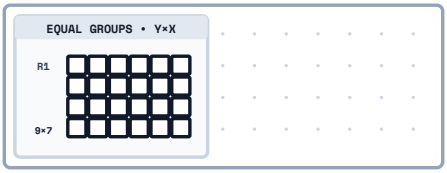
Final Verified Answer:

_____

[ ] Checked on SC-6

Investigation 3: Evaluate (9 + 7) ÷ (8 - 4) by finding the numerator sum and denominator difference first, then dividing.

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

_____

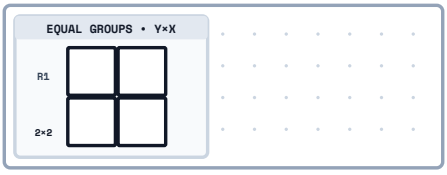
Final Verified Answer:

_____

[ ] Checked on SC-6

Investigation 4: A farmer collects 20 eggs, sets aside 2 cracked eggs, and divides the rest equally among 6 cartons. How many per carton?

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

_____

Final Verified Answer:

_____

[ ] Checked on SC-6

UNIT 05 PRACTICE WORKSHEET A • GRADES 3–4 (SC-6)

Unit 05 Practice A: Core Fluency

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 24 + 18 by Place Value & Stack.**

20 + 10 = 30; 4 + 8 = 12; 30 + 12 = 42. Key: [24] [ENTER] [18] [+].

Verified Answer: 42

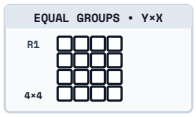
EXAMPLE 2 **Evaluate 52 - 19 using Y - X order.**

Register $Y = 52$, Register $X = 19 \rightarrow 52 - 19 = 33$. Key: [52] [ENTER] [19] [-].

Verified Answer: 33

1 Tier 1 • Builder

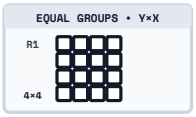
Expand by place value: 300 + 40 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

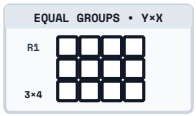
What is the value of the digit 6 in 462?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

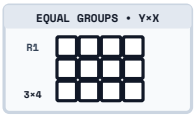
Add on paper & check on stack: 36 + 27 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

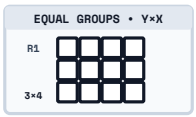
Add on paper & check on stack: 48 + 35 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

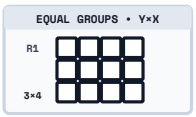
Subtract (*Y* - *X*): 64 - 28 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

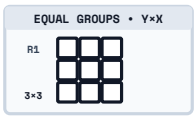
Subtract (*Y* - *X*): 81 - 45 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

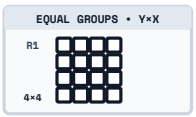
Multiply: 14 × 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

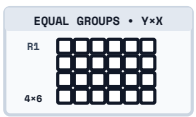
Multiply: 25 × 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

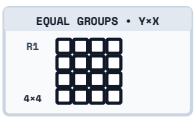
Divide (*Y* ÷ *X*): 72 ÷ 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Divide with Remainder: 23 ÷ 4 = (Quotient & Remainder)



Paper Step: _____ [ ] SC-6 Ans: _____