

Big Ideas Math Grade 6 — Chapter 1 • Manipulative Kits: Counting & Array Studio (COUNT-01) + Prime Factor Studio (PRIME-01)

Hands-On Block Remediation: Have students build physical tile rows for division remainders, stack 2D/3D arrays for exponents, use the 4-line elevator (Y holds Room 1 while X solves Room 2) instead of rewriting PEMDAS lines, and stand logarithmic Prime Factor Towers side-by-side on the 12-socket lid.

Optional QUEST-01 Scoreboard: 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 1.1: WHOLE NUMBER OPERATIONS & DIVISION WITH REMAINDERS [COUNT-01]		Method: Rectangular Array Model & Division Check (Dividend = Divisor × Quotie..	
#1: Arrange 31 tiles into rows of 6. Find Quotient & Remainder. SC-6 Keys: 31 [ENTER] 6 [g] [=R] Ans: 5 R 1	#2: Divide 47 ÷ 5 using tiles or [g] [=R]. SC-6 Keys: 47 [ENTER] 5 [g] [=R] Ans: 9 R 2		
#3: Divide 58 ÷ 7 and check with [f] [LASTX] [x] [=]. SC-6 Keys: 58 [ENTER] 7 [g] [=R] Ans: 8 R 2	#4: Divide 85 ÷ 9. How many full groups of 9 and how many left? SC-6 Keys: 85 [ENTER] 9 [g] [=R] Ans: 9 R 4		
#5: Divide 146 ÷ 12. Find the Quotient and Remainder. SC-6 Keys: 146 [ENTER] 12 [g] [=R] Ans: 12 R 2	#6: Divide 250 ÷ 36 and prove with [f] [LASTX] [x] [=]. SC-6 Keys: 250 [ENTER] 36 [g] [=R] Ans: 6 R 34		
#7: Find the missing dividend: Quotient = 14, Divisor = 8, Remainder = 5. SC-6 Keys: 14 [ENTER] 8 [x] [=] + Ans: 117	#8: Spot the Glitch: Sam says 75 ÷ 8 = 8 R 11. Why is R=11 impossible? Fix it! SC-6 Keys: 75 [ENTER] 8 [g] [=R] Ans: 9 R 3 (Rem < 8)		
#9: A 3D spool has 300g of PLA. Each box takes 42g. How many full boxes can you print, and how much PLA is.. SC-6 Keys: 300 [ENTER] 42 [g] [=R] Ans: 7 boxes, 6g left (May 2: 7..	#10: 115 students ride vans that hold 14 kids each. How many vans must be booked so nobody is left behind? SC-6 Keys: 115 [ENTER] 14 [g] [=R] Ans: 9 vans (8 full + 1 for 3 k..		

SEC 1.2: POWERS & EXPONENTS – SQUARES, CUBES & GROWTH [COUNT-01]		Method: Repeated Multiplication Factors, Perfect Squares (2D Array) & Cubes (3D Array)	
#1: Write 5^2 as repeated multiplication and find how many tiles are in a 5×5 square. SC-6 Keys: 5 [x*] Ans: 25	#2: Evaluate 7^2 and compare it to 7×2 . SC-6 Keys: 7 [x*] Ans: 49 (vs 14)		
#3: Evaluate 3^3 (a $3 \times 3 \times 3$ cube of blocks). SC-6 Keys: 3 [g] [x*] Ans: 27	#4: Evaluate 5^3 using repeated multiplication or [g] [x*]. SC-6 Keys: 5 [g] [x*] Ans: 125		
#5: Evaluate 2^5 by writing the repeated factors and checking with 2 [ENTER] 5 [g] [y*x]. SC-6 Keys: 2 [ENTER] 5 [g] [y*x] Ans: 32	#6: Evaluate 6^4 using repeated multiplication or [g] [y*x]. SC-6 Keys: 6 [ENTER] 4 [g] [y*x] Ans: 1,296		
#7: Evaluate 10^4 and 1^4 . How many zeros are in 10^4 ? SC-6 Keys: 10 [ENTER] 4 [g] [y*x] Ans: 10,000 and 1	#8: Spot the Glitch: Mia wrote $2^4 = 8$ because $2 \times 4 = 8$. Find the true value of 2^4 . SC-6 Keys: 2 [ENTER] 4 [g] [y*x] Ans: 16 (2x2x2x2)		
#9: A cell doubles every hour (2^n). How many cells are there after 6 hours (2^6)? Solve 2 ways! SC-6 Keys: 2 [ENTER] 6 [g] [y*x] Ans: 64 cells (Way 2: 2 [g] [REP..	#10: Mystery Cube: A giant cube uses 216 unit blocks. How many blocks wide is 1 edge? (Try [g] [x*y])! SC-6 Keys: 216 [ENTER] 3 [g] [x*y] Ans: 6 blocks wide (Way 2: 6 [g..		

SEC 1.3: ORDER OF OPERATIONS – GROUPING SYMBOLS, EXPONENTS & PEMDAS [COUNT-01]		Method: Order of Operations (PEMDAS: Grouping Symbols -> Powers -> Multiply/D..	
#1: Evaluate $5 + 2 \times 3$. Multiply before adding! SC-6 Keys: 5 [ENTER] 2 [ENTER] 3 [*] [+] Ans: 11	#2: Evaluate $(14 + 6) \div (7 - 2)$. Solve both parentheses first! SC-6 Keys: 14 [ENTER] 6 [+] 7 [ENTER] 2 [-] [:] Ans: 4		
#3: Evaluate $30 - 4 \times 6$. SC-6 Keys: 30 [ENTER] 4 [ENTER] 6 [*] [-] Ans: 6	#4: Evaluate $(9 + 3) \times (15 - 8)$. SC-6 Keys: 9 [ENTER] 3 [+] 15 [ENTER] 8 [-] [*] Ans: 84		
#5: Evaluate $50 - (3 + 4)^2$. Square the sum before subtracting from 50! SC-6 Keys: 50 [ENTER] 3 [ENTER] 4 [+] [x^2] [-] Ans: 1	#6: Evaluate $120 - 4 \times (3 + 2)^2$. SC-6 Keys: 120 [ENTER] 4 [ENTER] 3 [ENTER] 2 [+] .. Ans: 20		
#7: Fraction Bar Grouping: Evaluate $(24 + 12) \div (9 - 3)$. SC-6 Keys: 24 [ENTER] 12 [+] 9 [ENTER] 3 [-] [:] Ans: 6	#8: Evaluate $3^3 + 15 \div 3 - 2 \times 4$. SC-6 Keys: 3 [g] [x^2] 15 [ENTER] 3 [:] [+] 2 [ENT.. Ans: 24		
#9: Evaluate $10 + (15 - 3)^2 \div 9$ using PEMDAS step-by-step AND check on your SC-6. SC-6 Keys: 10 [ENTER] 15 [ENTER] 3 [-] [x^2] 9 [+]. Ans: 26 (Way 2: $10 + 144 \div 9 = 26$)	#10: Movie tickets: 2 adults at \$12 each and 4 kids at \$8 each, minus a \$10 coupon. Write an expression and fin.. SC-6 Keys: 2 [ENTER] 12 [*] 4 [ENTER] 8 [*] [+]. Ans: \$46 (Way 2: $24 + 32 - 10 =$		

SEC 1.4: PRIME FACTORIZATION – FACTOR TREES & LOGARITHMIC PRIME TOWERS [PRIME-01]		Method: Factor Trees, Prime vs. Composite Testing & Prime-Power Factorization..	
#1:	Draw a factor tree or stack $[2] + [2] + [3]$. Write the prime factorization of 12. SC-6 Keys: 12 [g] [FACT] Ans: $2^2 \times 3$	#2:	Find the prime factorization of 36 using blocks and [g] [FACT]. SC-6 Keys: 36 [g] [FACT] Ans: $2^2 \times 3^2$
#3:	Test 29 and 57 with [PRIME]. Which one is prime and which is composite? SC-6 Keys: 29 [PRIME], 57 [g] [FACT] Ans: 29 Prime; 57 Composite (3×19)	#4:	Find the prime factorization of 45. SC-6 Keys: 45 [g] [FACT] Ans: $3^2 \times 5$
#5:	Build the Prime Tower for 72. Show how 8×9 and 6×12 use the exact same blocks. SC-6 Keys: 72 [g] [FACT] Ans: $2^3 \times 3^2$	#6:	Find the prime factorization of 84. SC-6 Keys: 84 [g] [FACT] Ans: $2^2 \times 3 \times 7$
#7:	Find the prime factorization of 100. SC-6 Keys: 100 [g] [FACT] Ans: $2^2 \times 5^2$	#8:	What number has the prime tower $[2] + [2] + [3] + [7]$ ($2^2 \times 3 \times 7$)? SC-6 Keys: 2 [x] 3 [x] 7 [x] Ans: 84
#9:	Find the prime factorization of 180 both by splitting 18×10 AND with [g] [FACT]. SC-6 Keys: 180 [g] [FACT] Ans: $2^2 \times 3^2 \times 5$ (Way 2: $(2 \cdot 3)^2 \cdot 5$)	#10:	Mystery Vault Code: A 3-digit number equals $2^2 \times 3^2 \times 5$. Find the number and verify with [g] [FACT]. SC-6 Keys: 2 [g] [x] 3 [x] 5 [x] Ans: 360 (Way 2: $8 \times 9 \times 5 = 360$)

SEC 1.5: GREATEST COMMON FACTOR (GCF) & LEAST COMMON MULTIPLE (LCM) [PRIME-01]			Method: Venn Diagram of Prime Factors – Shared Overlap for GCF & Tallest Prim..		
#1:	Find the GCF and LCM of 12 and 18 using Prime Towers and [GCF] / [f] [LCM]. SC-6 Keys: 12 [ENTER] 18 [GCF] / [f] [LCM]	Ans: GCF = 6, LCM = 36	#2:	Find the GCF and LCM of 8 and 12. SC-6 Keys: 8 [ENTER] 12 [GCF] / [f] [LCM]	Ans: GCF = 4, LCM = 24
#3:	Find the GCF and LCM of 15 and 25. SC-6 Keys: 15 [ENTER] 25 [GCF] / [f] [LCM]	Ans: GCF = 5, LCM = 75	#4:	Find the GCF and LCM of 14 and 35. SC-6 Keys: 14 [ENTER] 35 [GCF] / [f] [LCM]	Ans: GCF = 7, LCM = 70
#5:	Find the GCF and LCM of 16 and 24. SC-6 Keys: 16 [ENTER] 24 [GCF] / [f] [LCM]	Ans: GCF = 8, LCM = 48	#6:	Find the GCF and LCM of 28 and 42. SC-6 Keys: 28 [ENTER] 42 [GCF] / [f] [LCM]	Ans: GCF = 14, LCM = 84
#7:	Two prime numbers are 5 and 7. What is their GCF and what is their LCM? SC-6 Keys: 5 [ENTER] 7 [GCF] / [f] [LCM]	Ans: GCF = 1, LCM = 35	#8:	Verify that $GCF(15, 20) \times LCM(15, 20)$ equals 15×20 . SC-6 Keys: 15 [ENTER] 20 [GCF] ... [x]	Ans: $5 \times 60 = 300$ (Matches 15×20.)
#9*:	Hot dogs come in packs of 12 and buns in packs of 15. What is the smallest number of each to buy with 0 le.. SC-6 Keys: 12 [ENTER] 15 [f] [LCM]	Ans: 60 (5 packs dogs, 4 packs..	#10*:	You have 36 red tiles and 48 blue tiles to pack into identical kit bags with none left over. What is the max nu.. SC-6 Keys: 36 [ENTER] 48 [GCF]	Ans: 12 bags (3 red, 4 blue per..



Unit 2: Fractions & Decimals — Complete Key

Big Ideas Math Grade 6 — Chapter 2 • Manipulative Kits: Fraction Studio (FRAC-01) + Place Value Studio (PLACE-01)

Target Misconception: Students treat fractions, mixed numbers, and decimals as unrelated rules, expect multiplication to always make numbers bigger, forget which fraction to flip in division, and misalign decimal columns.

Hands-On Block Remediation: Use the 84.0 mm Fraction Studio towers so equivalence and common denominators are physical millimeter height matches. Use [f] [1/x] on Floor 1 (X) so students see only the divisor flip, and use [f] [IP] / [g] [FP] to split whole dollars from decimal cents.

Optional QUEST-01 Scoreboard: 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 2.1: EQUIVALENT FRACTIONS, MIXED NUMBERS & ADDING TOWERS [FRAC-01]		Method: Equivalent Fractions via GCF Simplification & Adding/Subtracting with..	
#1:	Simplify 8/12 using [g] [SIMP]. What intermediate fraction appears first? SC-6 Keys: [.] 8 [.] 12 [ENTER] [g] [SIMP] ×2 Ans: 4/6 -> 2/3	#2:	Simplify 24/36 completely and check its decimal with [FDISP]. SC-6 Keys: [.] 24 [.] 36 [ENTER] [g] [SIMP]... Ans: 2/3 (0.667)
#3:	Convert 2 3/5 into an improper fraction ([f] [d/c]) and a decimal ([FDISP]). SC-6 Keys: 2 [.] 3 [.] 5 [ENTER] [f] [d/c] Ans: 13/5 and 2.6	#4:	Convert 19/8 into a mixed number ([a b/c]) and a decimal ([FDISP]). SC-6 Keys: [.] 19 [.] 8 [ENTER] [FDISP] Ans: 2 3/8 and 2.375
#5:	Add 1/2 + 1/3 using a common denominator (sixths) and check with 84mm Fraction Blocks. SC-6 Keys: [.] 1 [.] 2 [ENTER] [.] 1 [.] 3 [+] Ans: 5/6 (42mm+28mm=70mm)	#6:	Add 3/4 + 5/6 using the LCD (12). Write both the mixed number and improper fraction. SC-6 Keys: [.] 3 [.] 4 [ENTER] [.] 5 [.] 6 [+] Ans: 1 7/12 (or 19/12)
#7:	Subtract 7/8 - 1/4 and verify with [f] [LASTX] [+]. SC-6 Keys: [.] 7 [.] 8 [ENTER] [.] 1 [.] 4 [-] Ans: 5/8	#8:	Subtract mixed numbers: 4 1/3 - 1 5/6. SC-6 Keys: 4 [.] 1 [.] 3 [ENTER] 1 [.] 5 [.] 6 [-] Ans: 2 1/2 (or 5/2)
#9*:	Build 1/3 + 1/4 with 84mm towers (28mm + 21mm) AND solve using the LCD (twelfths). SC-6 Keys: [.] 1 [.] 3 [ENTER] [.] 1 [.] 4 [+] Ans: 7/12 (49mm = seven 7mm twe..	#10*:	A trail is 3 3/4 miles long. You hiked 1 7/8 miles. How much trail is left? Solve 2 ways! SC-6 Keys: 3 [.] 3 [.] 4 [ENTER] 1 [.] 7 [.] 8 [-] Ans: 1 7/8 miles (Way 2: 30/8 -..

SEC 2.2: MULTIPLYING FRACTIONS & MIXED NUMBERS [FRAC-01]		Method: Area/Tower Model for Fraction × Fraction & Cross-Canceling Common Fac..	
#1:	Find 1/2 × 2/3. (Hold two 1/3 blocks and take half of them!) SC-6 Keys: [.] 1 [.] 2 [ENTER] [.] 2 [.] 3 × Ans: 1/3	#2:	Find 2/3 × 3/4 and check with [f] [LASTX] [+]. SC-6 Keys: [.] 2 [.] 3 [ENTER] [.] 3 [.] 4 × Ans: 1/2
#3:	Multiply 3/5 × 5/9. SC-6 Keys: [.] 3 [.] 5 [ENTER] [.] 5 [.] 9 × Ans: 1/3	#4:	Multiply a whole number by a fraction: 12 × 3/4. SC-6 Keys: 12 [ENTER] [.] 3 [.] 4 × Ans: 9
#5:	Multiply mixed numbers: 1 3/4 × 2 2/7. SC-6 Keys: 1 [.] 3 [.] 4 [ENTER] 2 [.] 2 [.] 7 × Ans: 4	#6:	Multiply 2 1/4 × 1 1/3. SC-6 Keys: 2 [.] 1 [.] 4 [ENTER] 1 [.] 1 [.] 3 × Ans: 3
#7:	Multiply 3 1/2 × 2 1/2. Write the answer as a mixed number and decimal. SC-6 Keys: 3 [.] 1 [.] 2 [ENTER] 2 [.] 1 [.] 2 × Ans: 8 3/4 (8.75)	#8:	Prediction Check: Without calculating, is 5 × 2/3 greater than 5 or less than 5? Now compute it! SC-6 Keys: 5 [ENTER] [.] 2 [.] 3 × Ans: 3 1/3 (Less than 5!)
#9*:	A slime recipe uses 1 3/4 cups of glue per batch. How much glue is needed for 2 1/2 batches? SC-6 Keys: 1 [.] 3 [.] 4 [ENTER] 2 [.] 1 [.] 2 × Ans: 4 3/8 cups (Way 2: 1.75 ×..	#10*:	Triple Chain: Evaluate 4/5 × 5/6 × 3/4 both by cross-canceling common factors AND on your SC-6! SC-6 Keys: [.] 4 [.] 5 [ENTER] [.] 5 [.] 6 [ENTER] [.] 3 [.] 4 × Ans: 1/2 (Way 2: cancel 4s & 5s..

SEC 2.3: DIVIDING FRACTIONS & MIXED NUMBERS — WHY RECIPROCAL FLIP WORKS [FRAC-01]		Method: Measurement Division ('How Many Fit?') & Multiplying by the Reciproca..	
#1:	How many 1/4 blocks fit in a 1/2 tower? Compute 1/2 ÷ 1/4. SC-6 Keys: [.] 1 [.] 2 [ENTER] [.] 1 [.] 4 ÷ Ans: 2	#2:	How many 1/6 blocks (14mm) fit in a 2/3 tower (56mm)? Compute 2/3 ÷ 1/6. SC-6 Keys: [.] 2 [.] 3 [ENTER] [.] 1 [.] 6 ÷ Ans: 4
#3:	Divide 5/6 ÷ 5/12 by multiplying by the reciprocal ([f] [1/x] [×]). SC-6 Keys: [.] 5 [.] 6 [ENTER] [.] 5 [.] 12 [f] [1/x] [×] Ans: 2	#4:	Divide a whole number by a fraction: 6 ÷ 3/4. SC-6 Keys: 6 [ENTER] [.] 3 [.] 4 ÷ Ans: 8
#5:	Divide 3/4 ÷ 2/5. Write the answer as a mixed number. SC-6 Keys: [.] 3 [.] 4 [ENTER] [.] 2 [.] 5 ÷ Ans: 1 7/8 (15/8)	#6:	Divide a fraction by a whole number: 4/5 ÷ 2. SC-6 Keys: [.] 4 [.] 5 [ENTER] 2 ÷ Ans: 2/5
#7:	Divide mixed numbers: 4 1/2 ÷ 3/4. SC-6 Keys: 4 [.] 1 [.] 2 [ENTER] [.] 3 [.] 4 ÷ Ans: 6	#8:	Divide 5 1/4 ÷ 1 3/4 and prove with [f] [LASTX] [×]. SC-6 Keys: 5 [.] 1 [.] 4 [ENTER] 1 [.] 3 [.] 4 ÷ Ans: 3
#9*:	A board is 6 3/4 ft long. You cut it into 3/4-ft shelves. How many shelves can you cut? Solve 2 ways! SC-6 Keys: 6 [.] 3 [.] 4 [ENTER] [.] 3 [.] 4 ÷ Ans: 9 shelves (Way 2: 27 fourt..	#10*:	A 3 3/4-cup pitcher of smoothie is poured into 5/8-cup glasses. How many glasses does it fill? SC-6 Keys: 3 [.] 3 [.] 4 [ENTER] [.] 5 [.] 8 ÷ Ans: 6 glasses (Way 2: 30/8 ÷ 5..

SEC 2.4: ADDING, SUBTRACTING & MULTIPLYING DECIMALS [PLACE-01]		Method: Vertical Decimal Point Alignment (+/-) & Counting Decimal Places / Es..	
#1:	Enter 27.64. Use [f] [IP] and [g] [FP] to write its Whole part and Decimal part. SC-6 Keys: 27.64 [f] [IP] / [g] [FP] Ans: Whole = 27, Decimal = 0.64	#2:	Line up the decimal points to add 12.8 + 4.75, and check with [f] [LASTX] [-]. SC-6 Keys: 12.8 [ENTER] 4.75 [+] Ans: 17.55
#3:	Annex zeros to subtract 20.00 - 8.65. SC-6 Keys: 20 [ENTER] 8.65 [-] Ans: 11.35	#4:	Multiply 4.5 × 0.6. SC-6 Keys: 4.5 [ENTER] 0.6 × Ans: 2.7
#5:	Evaluate 25.4 - 9.86 + 3.2. SC-6 Keys: 25.4 [ENTER] 9.86 [-] 3.2 [+] Ans: 18.74	#6:	Multiply 3.6 × 2.25 and check the whole-number ballpark. SC-6 Keys: 3.6 [ENTER] 2.25 × Ans: 8.1
#7:	Multiply 0.15 × 0.4 and tap [FDISP] to see its simplified fraction. SC-6 Keys: 0.15 [ENTER] 0.4 × [FDISP] Ans: 0.06 (3/50)	#8:	Find the area of a rectangular desk top measuring 1.8 m by 0.75 m. SC-6 Keys: 1.8 [ENTER] 0.75 × Ans: 1.35 m²
#9*:	You pay with a \$20 bill for a \$8.75 burger and \$4.60 smoothie. How much change do you get? SC-6 Keys: 20 [ENTER] 8.75 [ENTER] 4.60 [+] Ans: \$6.65 (Way 2: 20 - 8.75 -..	#10*:	Multiply 4.75 × 1.2 both as decimals AND as fractions (4 3/4 × 1 1/5) using [FDISP]! SC-6 Keys: 4.75 [ENTER] 1.2 × Ans: 5.7 or 5 7/10 (Way 2: 19/4..

SEC 2.5: DIVIDING DECIMALS & THE 3-WAY FRACTION-DECIMAL-REMAINDER TRANSLATOR [FRAC-01]		Method: Power-of-10 Divisor Shift & 3-Way Translation (Decimal <-> Mixed Numb..	
#1:	Write 39 ÷ 8 as (a) Quotient + Remainder, (b) Decimal, and (c) Mixed Number. SC-6 Keys: 39 [ENTER] 8 ÷ [FDISP] Ans: 4 R 7, 4.875, 4 7/8	#2:	Divide a decimal by a whole number: 18.4 ÷ 8. SC-6 Keys: 18.4 [ENTER] 8 ÷ Ans: 2.3
#3:	How many quarters (\$0.25) are in \$11.25? Compute 11.25 ÷ 0.25. SC-6 Keys: 11.25 [ENTER] 0.25 ÷ Ans: 45	#4:	Divide 7.2 ÷ 0.9 and check with [f] [LASTX] [×]. SC-6 Keys: 7.2 [ENTER] 0.9 ÷ Ans: 8
#5:	Divide 15.6 ÷ 0.12. SC-6 Keys: 15.6 [ENTER] 0.12 ÷ Ans: 130	#6:	Divide 9.45 ÷ 1.5 and tap [FDISP] to write its mixed fraction form. SC-6 Keys: 9.45 [ENTER] 1.5 ÷ [FDISP] Ans: 6.3 (6 3/10)
#7:	Divide 0.84 ÷ 0.07. SC-6 Keys: 0.84 [ENTER] 0.07 ÷ Ans: 12	#8:	Spot the Glitch: Leo says 4.8 ÷ 0.2 = 0.24. Use [f] [LASTX] or estimation to fix it! SC-6 Keys: 4.8 [ENTER] 0.2 ÷ Ans: 24 (0.2 fits 5 times per 1)
#9*:	A runner completes a 4.5-mile race in 0.75-mile laps. How many laps is the race? Solve 2 ways! SC-6 Keys: 4.5 [ENTER] 0.75 ÷ Ans: 6 laps (Way 2: 4 1/2 ÷ 3/4..	#10*:	A 6-pack of sports drinks costs \$7.50. What is the cost of 1 bottle, and how many bottles can \$20 buy? SC-6 Keys: 7.50 [ENTER] 6 ÷ -> 1.25; 20 [ENTER].. Ans: \$1.25/bottle; 16 bottles



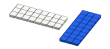
Unit 3: Ratios, Rates & Percents — Complete Key

Big Ideas Math Grade 6 — Chapters 3, 4 & 5 (Ratios, Rates & Percents) • Manipulative Kits: Counting & Array Tiles (COUNT-01) + Fraction Studio (FRAC-01)

Target Misconception: Students confuse Part-to-Part (3:2) with Part-to-Whole (3/5), add instead of multiply in ratio tables, divide unit rates upside-down, and memorize 6 disconnected rules for moving decimal points in percents.

Hands-On Block Remediation: Use Blue and Gold Counting Tiles as physical Tape Diagram boxes, step through ratio tables rhythmically with [g] [REP], use [x->y] when unit-rate division is entered upside-down, and use [f] [%] + [FDISP] to show Fraction/Decimal/Percent are three costumes of one number.

Optional QUEST-01 Scoreboard: 1 '+'10' block = Solved 1 Way; stack a 2nd '+'10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 3.1: RATIOS & TAPE DIAGRAMS — PART-TO-PART VS. PART-TO-WHOLE [COUNT-01]		Method: Part-to-Part vs. Part-to-Whole Tape Diagrams & GCF Ratio Simplification	
#1:	Simplify the ratio 12 : 18 using [g] [a:b]. SC-6 Keys: 12 [ENTER] 18 [g] [a:b] Ans: 2 : 3	#2:	Simplify the ratio 24 : 16 using [g] [a:b]. SC-6 Keys: 24 [ENTER] 16 [g] [a:b] Ans: 3 : 2
#3:	A bag has 4 red marbles and 6 blue marbles. Find the simplified ratio of red to TOTAL marbles. SC-6 Keys: 4 [ENTER] 10 [g] [a:b] Ans: 2 : 5	#4:	In a 3:4 tape diagram, each tile is worth 6. Find the two parts and the total. SC-6 Keys: 3 [ENTER] 6 [x], 4 [ENTER] 6 [x] Ans: 18, 24 (Total = 42)
#5:	Green paint mixes blue and yellow in a 2:3 ratio. If you use 25 cups total, how many cups of each? SC-6 Keys: 25 [ENTER] 5 [÷] -> 5/tile Ans: 10 blue, 15 yellow	#6:	The ratio of cats to dogs at a shelter is 4:5. There are 36 animals total. How many are dogs? SC-6 Keys: 36 [ENTER] 9 [÷] 5 [x] Ans: 20 dogs
#7:	The ratio of boys to girls in a club is 3:5. If there are 15 boys, how many girls are there? SC-6 Keys: 15 [ENTER] 3 [÷] 5 [x] Ans: 25 girls	#8:	Difference Tape Model: The ratio of acoustic to electric guitars is 2:5. There are 18 MORE electric guitars. F.. SC-6 Keys: 18 [ENTER] 3 [÷] 5 [x] Ans: 30 electric (12 acoustic)
#9*:	Two robot teams split 84 gears in a 4:3 ratio. How many gears does each team get? Solve 2 ways! SC-6 Keys: 84 [ENTER] 7 [÷] -> 12/tile Ans: 48 and 36 gears (Way 2: 4/..	#10*:	Ratio of gold to silver coins is 7:4. There are 21 more gold coins than silver. How many coins in all? SC-6 Keys: 21 [ENTER] 3 [÷] 11 [x] Ans: 77 coins total (Way 2: 49..

SEC 3.2: RATIO TABLES & DOUBLE NUMBER LINES VIA [g] [REP] [COUNT-01]		Method: Equivalent Ratio Tables & Double Number Lines via Repeated Addition o..	
#1:	Use 4 [g] [REP] and 9 [g] [REP] to write the first 4 equivalent ratios of 4 : 9. SC-6 Keys: 4 [g] [REP] [+], 9 [g] [REP] [+] Ans: 4:9, 8:18, 12:27, 16:36	#2:	In a ratio table where A : B = 4 : 9, find B when A = 28. SC-6 Keys: 28 [ENTER] 4 [÷] 9 [x] Ans: 63
#3:	In a ratio table where X : Y = 5 : 12, find X when Y = 60. SC-6 Keys: 60 [ENTER] 12 [÷] 5 [x] Ans: 25	#4:	A printer prints 15 pages every 2 minutes. How many pages in 8 minutes? SC-6 Keys: 8 [ENTER] 2 [÷] 15 [x] Ans: 60 pages
#5:	Hot cocoa uses 3 tbsp cocoa for every 8 oz milk. How much milk for 18 tbsp cocoa? SC-6 Keys: 18 [ENTER] 3 [÷] 8 [x] Ans: 48 oz milk	#6:	8 markers cost \$12. Scale down to 2 markers, then scale up to find the cost of 10 markers. SC-6 Keys: 12 [ENTER] 4 [÷] 5 [x] Ans: \$15
#7:	A heart beats 21 times in 15 seconds. How many beats in 60 seconds (1 minute)? SC-6 Keys: 60 [ENTER] 15 [÷] 21 [x] Ans: 84 beats	#8:	Spot the Glitch: For 3:5, Sam added 4 to both sides and wrote 7:9. Test with [g] [a:b]—are they equal? SC-6 Keys: 7 [ENTER] 9 [g] [a:b] Ans: No! Multiply by 3 -> 9:15
#9*:	9 smoothies take 12 cups of berries. How many cups of berries for 15 smoothies? Solve 2 ways! SC-6 Keys: 12 [ENTER] 3 [÷] 5 [x] Ans: 20 cups (Way 2: 12÷9 × 15..	#10*:	An e-bike travels 14 miles on 35% battery. How far can it travel on 100% battery? SC-6 Keys: 14 [ENTER] 7 [÷] 20 [x] Ans: 40 miles (Way 2: 2 mi per..

SEC 3.3: UNIT RATES & BEST-BUY SHOWDOWNS (PLUS [X÷Y] SWAP RESCUE) [COUNT-01]		Method: Unit Rate Method (Dividing to Find Amount per 1 Unit) & Best-Buy Unit..	
#1:	Find the unit speed in miles per hour: 195 miles in 3 hours. SC-6 Keys: 195 [ENTER] 3 [÷] Ans: 65 mph	#2:	You typed 4 [ENTER] 36 for \$36 in 4 hours. Press [x->y] [÷] to find the hourly pay! SC-6 Keys: 4 [ENTER] 36 [x->y] [÷] Ans: \$9 / hour
#3:	Find the unit price per pound: \$7.80 for 6 pounds of apples. SC-6 Keys: 7.80 [ENTER] 6 [÷] Ans: \$1.30 / lb	#4:	A 3D printer uses 90 grams of filament in 6 hours. How many grams per hour? SC-6 Keys: 90 [ENTER] 6 [÷] Ans: 15 g / hr
#5:	Best Buy: Cereal A is \$4.50 for 15 oz. Cereal B is \$5.04 for 18 oz. Find both unit prices! SC-6 Keys: 4.50 [ENTER] 15 [÷]; 5.04 [ENTER] 18. Ans: Cereal B (\$0.28/oz vs \$0.3..	#6:	Best Buy: 6-pack of pens for \$5.10 vs. 10-pack of pens for \$8.20. SC-6 Keys: 5.10 [ENTER] 6 [÷]; 8.20 [ENTER] 10 [÷] Ans: 10-pack (\$0.82 vs \$0.85)
#7:	A train travels 210 miles in 3.5 hours. At this rate, how far does it travel in 5 hours? SC-6 Keys: 210 [ENTER] 3.5 [÷] 5 [x] Ans: 300 miles	#8:	Pump A fills 45 gallons in 5 min. Pump B fills 64 gallons in 8 min. Which pump is faster? SC-6 Keys: 45 [ENTER] 5 [÷]; 64 [ENTER] 8 [÷] Ans: Pump A (9 gal/min vs 8 gal..
#9*:	An extruder pushes 45 mm of filament in 15 seconds. How much in 60 seconds (1 min)? Solve 2 ways! SC-6 Keys: 45 [ENTER] 15 [÷] 60 [x] Ans: 180 mm (Way 2: 60s is 4×15..	#10*:	Car A drives 168 miles on 6 gallons. Car B drives 232 miles on 8 gallons. Which car gets more mpg? SC-6 Keys: 168 [ENTER] 6 [÷]; 232 [ENTER] 8 [÷] Ans: Car B (29 mpg vs 28 mpg)

SEC 3.4: PERCENTS, FRACTIONS & DECIMALS — THE 3-COSTUME SWITCHER [FRAC-01]		Method: 10×10 Hundredths Grid ('Per 100') & 3-Way Fraction-Decimal-Percent Tr..	
#1:	Write 3/5 as a decimal and as a percent. SC-6 Keys: [.] 3 [.] 5 [ENTER] [FDISP] Ans: 0.6 and 60%	#2:	Write 9/25 as a decimal and as a percent. SC-6 Keys: [.] 9 [.] 25 [ENTER] [FDISP] Ans: 0.36 and 36%
#3:	Write 45% as a decimal and as a simplified fraction ([FDISP]). SC-6 Keys: 45 [ENTER] 100 [÷] [FDISP] Ans: 0.45 and 9/20	#4:	Write 0.125 as a percent and as a simplified fraction ([FDISP]). SC-6 Keys: 0.125 [ENTER] [FDISP] Ans: 12.5% and 1/8
#5:	Find 30% of 80 using the [f] [%] key: 80 [ENTER] 30 [f] [%]. SC-6 Keys: 80 [ENTER] 30 [f] [%] Ans: 24	#6:	Find 15% of 60. SC-6 Keys: 60 [ENTER] 15 [f] [%] Ans: 9
#7:	You answered 21 out of 25 questions right. What is your score as a percent? SC-6 Keys: 21 [ENTER] 25 [÷] Ans: 84%	#8:	Convert 150% into a decimal and a mixed fraction. SC-6 Keys: 150 [ENTER] 100 [÷] [FDISP] Ans: 1.5 and 1 1/2
#9*:	Order 5/8, 60%, and 0.61 from least to greatest by converting all 3 to decimals (and percents!). SC-6 Keys: [.] 5 [.] 8 [FDISP] -> 0.625 Ans: 60%, 0.61, 5/8 (Way 2: 60%..	#10*:	A phone battery is at 35% of its 4,000 mAh capacity. How many mAh remain? Solve 2 ways! SC-6 Keys: 4000 [ENTER] 35 [f] [%] Ans: 1,400 mAh (Way 2: 7/20 × 4..

SEC 3.5: DISCOUNTS, PERCENT CHANGE ([g] [%CHG]) & UNIT CONVERSIONS [PLACE-01]		Method: Discounts, Markup/Tax, Percent Change (Change / Original) & Unit Fact..	
#1:	An \$80 pair of shoes is 30% off. Find the discount (X) and sale price (-). SC-6 Keys: 80 [ENTER] 30 [f] [%] [-] Ans: Discount \$24; Sale \$56	#2:	A \$40 restaurant meal has a 15% tip. Find the tip and total bill (+). SC-6 Keys: 40 [ENTER] 15 [f] [%] [+] Ans: Tip \$6; Total \$46
#3:	Find the percent change from 50 to 65 using [g] [%CHG]. SC-6 Keys: 50 [ENTER] 65 [g] [%CHG] Ans: +30%	#4:	Find the percent change from 80 down to 60 using [g] [%CHG]. SC-6 Keys: 80 [ENTER] 60 [g] [%CHG] Ans: -25%
#5:	Convert 10 inches to centimeters using [f] [->cm] (2.54 cm = 1 in). SC-6 Keys: 10 [f] [->cm] Ans: 25.4 cm	#6:	Convert 50.8 centimeters back to inches using [g] [->in] ([g][1]). SC-6 Keys: 50.8 [g] [->in] Ans: 20 in
#7:	Convert 11 pounds to kilograms using [f] [->kg] ([f][3]). SC-6 Keys: 11 [f] [->kg] Ans: 4.99 kg	#8:	Reverse Percent: 18 is 25% of what number? (Divide 18 by 0.25!) SC-6 Keys: 18 [ENTER] 0.25 [÷] Ans: 72
#9*:	A \$120 skateboard is 20% off. Find the sale price both by subtracting [f] [%] AND by multiplying by 80%! SC-6 Keys: 120 [ENTER] 20 [f] [%] [-] Ans: \$96 (Way 2: 120 × 0.80 = 96)	#10*:	A 32-inch deck weighs 5 lbs. Convert length to cm ([f] [->cm]) and weight to kg ([f] [->kg]). Verify with ×2.54! SC-6 Keys: 32 [f] [->cm]; 5 [f] [->kg] Ans: 81.28 cm, 2.27 kg (Way 2: ..



Unit 4: Algebraic Expressions & Properties — Complete Key

Big Ideas Math Grade 6 — Chapter 3 / Chapter 5 (Algebraic Expressions) • Manipulative Kits: Algebra Boxes & Factoring Stage (ALGB-01) + Counting Tiles (COUNT-01)

Target Misconception: Students panic when letters appear, erroneously combine $3x + 2$ into $5x$ or $x^2 + x$ into x^3 , and don't see why $3(x + 4) = 3x + 12$.Hands-On Block Remediation: Show that a variable x is literally a physical green x -rod (42×14 mm) whereas 1 is a small yellow unit cube (14×14 mm) and x^2 is a large blue flat (42×42 mm)—different physical shapes cannot be counted as one pile! Build rectangles on the L-frame stage for the Distributive Property.

Optional QUEST-01 Scoreboard: 1 'x10' block = Solved 1 Way; stack a 2nd 'x10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 4.1: EVALUATING ALGEBRAIC EXPRESSIONS – VARIABLE BOXES ON THE STACK [ALGB-01]		Method: Variable Substitution, Evaluating Algebraic Expressions & Translating..	
#1: Evaluate $6x - 9$ when $x = 7$. SC-6 Keys: 6 [ENTER] 7 [×] 9 [-] Ans: 33	#2: Evaluate $5n + 14$ when $n = 8$. SC-6 Keys: 5 [ENTER] 8 [×] 14 [+] Ans: 54		
#3: Evaluate $40 - 3m$ when $m = 9$. (Park 40 on Y first!) SC-6 Keys: 40 [ENTER] 3 [ENTER] 9 [×] [-] Ans: 13	#4: Evaluate $x^2 + 11$ when $x = 6$. SC-6 Keys: 6 [x^*] 11 [+] Ans: 47		
#5: Evaluate $2y^2 - 5$ when $y = 4$. (Square 4 before multiplying by 2!) SC-6 Keys: 4 [x^*] 2 [×] 5 [-] Ans: 27	#6: Evaluate $7a + 3b$ when $a = 4$ and $b = 9$. SC-6 Keys: 7 [ENTER] 4 [×] 3 [ENTER] 9 [×] [+] Ans: 55		
#7: Evaluate $(x + y) + 4$ when $x = 19$ and $y = 13$. SC-6 Keys: 19 [ENTER] 13 [+] 4 [+] Ans: 8	#8: Evaluate $5k - 2.4$ when $k = 3.5$. SC-6 Keys: 5 [ENTER] 3.5 [×] 2.4 [-] Ans: 15.1		
#9*: Skate park rental costs \$8 flat plus \$4.50 per hour ($8 + 4.50h$). Find the cost for 4 hours 2 ways! SC-6 Keys: 4.50 [ENTER] 4 [×] 8 [+] Ans: \$26 (Way 2: $8+4.5+4.5+4.5+..$)	#10*: Surface area of a cube is $6s^2$. Find the surface area when edge $s = 5$ cm. SC-6 Keys: 5 [x^*] 6 [×] Ans: 150 cm² (Way 2: 6 faces ×..)		

SEC 4.2: COMBINING LIKE TERMS — WHY X ² FLATS, X RODS & 1 CUBES NEVER MIX [ALGB-01]		Method: Identifying Terms/Coefficients/Constants & Sorting and Combining Like..	
#1: Sort and simplify: $7x + 4 + 2x + 9$. SC-6 Keys: 7 [ENTER] 2 [+]; 4 [ENTER] 9 [+] Ans: $9x + 13$	#2: Simplify: $8x + 11 - 3x - 4$. SC-6 Keys: 8 [ENTER] 3 [-]; 11 [ENTER] 4 [-] Ans: $5x + 7$		
#3: Simplify: $9y - y + 6$. (Remember: -y means -1y!) SC-6 Keys: 9 [ENTER] 1 [-] Ans: $8y + 6$	#4: Simplify: $12a + 5 - 4a + 8$. SC-6 Keys: 12 [ENTER] 4 [-]; 5 [ENTER] 8 [+] Ans: $8a + 13$		
#5: Sort all 3 tile shapes: $4x^2 + 3x + 2x^2 + 5x + 7$. SC-6 Keys: 4+2=6; 3+5=8 Ans: $6x^2 + 8x + 7$	#6: Simplify: $6n^2 + 9n - 2n^2 - 4n + 10$. SC-6 Keys: 6-2=4; 9-4=5 Ans: $4n^2 + 5n + 10$		
#7: Simplify with decimals: $3.5x + 4.2 + 1.8x - 1.5$. SC-6 Keys: 3.5 [ENTER] 1.8 [+]; 4.2 [ENTER] 1.5.. Ans: $5.3x + 2.7$	#8: Spot the Glitch: Leo simplified $5x + 3$ to $8x$. Test $x = 10$ on your SC-6 to prove $5x + 3 \neq 8x$! SC-6 Keys: 5(10)+3=53 vs 8(10)=80 Ans: $53 \neq 80$; $5x + 3$ is alread..		
#9*: A rectangle has two sides of $(2x + 3)$ and two sides of $(x + 5)$. Write its simplified perimeter & test $x=10$! SC-6 Keys: 2+2+1+1=6x; 3+3+5+5=16 Ans: $6x + 16$ (At $x=10$: both giv..	#10*: A triangle has sides $(3x + 2)$, $(2x + 7)$, and $(4x - 1)$. Write the simplified perimeter & test $x=5$! SC-6 Keys: 3+2+4=9x; 2+7-1=8 Ans: $9x + 8$ (At $x=5$: $17+17+19 = ..$		

SEC 4.3: THE DISTRIBUTIVE PROPERTY – ONE SPLIT RECTANGLE, TWO WAYS [ALGB-01]		Method: The Distributive Property Area Model – Splitting Rectangles as a(b + ..	
#1: Compute 7 × (20 + 3) both ways on your SC-6. Write the two partial products. SC-6 Keys: 7 [ENTER] 20 [×] 7 [ENTER] 3 [×] [+] Ans: 140 + 21 = 161	#2: Build 4 rows of (x + 5) and write the distributed expression for 4(x + 5). SC-6 Keys: 4 [ENTER] 5 [×] Ans: 4x + 20		
#3: Use the Distributive Property to expand 6(3x + 4). SC-6 Keys: 6×3=18; 6×4=24 Ans: 18x + 24	#4: Expand 8(2y - 5). Watch the subtraction sign! SC-6 Keys: 8×2=16; 8×5=40 Ans: 16y - 40		
#5: Mental Math Split: Compute 9 × 43 by splitting 43 into (40 + 3). SC-6 Keys: 9 [ENTER] 40 [×] 9 [ENTER] 3 [×] [+] Ans: 387	#6: Distribute and combine like terms: 3(4x + 2) + 5x. SC-6 Keys: 3×4+5=17; 3×2=6 Ans: 17x + 6		
#7: Distribute and combine: 4(3n + 5) - 7. SC-6 Keys: 4×3=12; 20-7=13 Ans: 12n + 13	#8: Spot the Glitch: Mia wrote 5(x + 6) = 5x + 6. What did she forget to multiply by 5? SC-6 Keys: 5 [ENTER] 6 [×] Ans: 5x + 30 (Must multiply 6 b..		
#9*: Simplify 5(2x + 3) + 4x AND prove your answer matches the original when x = 2! SC-6 Keys: 5×2+4=14; 5×3=15 Ans: 14x + 15 (At x=2: both equ..	#10*: 6 friends each buy a burger (\$x) and \$3.50 fries: 6(x + 3.50). Expand it and evaluate for x = \$6.50! SC-6 Keys: 6 [ENTER] 3.50 [×] -> 6x+21 Ans: 6x + 21; \$60 total		

SEC 4.4: FACTORING EXPRESSIONS WITH GCF – REVERSE THE RECTANGLE [ALGB-01]		Method: Factoring Numerical & Algebraic Expressions by Dividing Out the Great..	
#1: Factor $12 + 20$ into the form $a(b + c)$ using [GCF]. SC-6 Keys: 12 [ENTER] 20 [GCF] -> 4 Ans: 4(3 + 5)	#2: Factor $8x + 12$ using [GCF]. SC-6 Keys: 8 [ENTER] 12 [GCF] -> 4 Ans: 4(2x + 3)		
#3: Factor $15y - 25$ using [GCF]. SC-6 Keys: 15 [ENTER] 25 [GCF] -> 5 Ans: 5(3y - 5)	#4: Factor $24x + 36$ completely using [GCF]. SC-6 Keys: 24 [ENTER] 36 [GCF] -> 12 Ans: 12(2x + 3)		
#5: Factor $32n - 48$ completely using [GCF]. SC-6 Keys: 32 [ENTER] 48 [GCF] -> 16 Ans: 16(2n - 3)	#6: Factor $42a + 14$ completely. (Careful: what is $14 \div 14$?) SC-6 Keys: 42 [ENTER] 14 [GCF] -> 14 Ans: 14(3a + 1)		
#7: Factor $36m - 60$ completely using [GCF]. SC-6 Keys: 36 [ENTER] 60 [GCF] -> 12 Ans: 12(3m - 5)	#8: Spot the Glitch: Sam factored $24x + 36$ as $6(4x + 6)$. Why isn't it factored completely? SC-6 Keys: 4 [ENTER] 6 [GCF] -> 2 left! Ans: 12(2x + 3) (4 and 6 still..)		
#9*: A rectangular banner has area $(28x + 42)$ sq in and height 14 in. Factor with [GCF] to find its width! SC-6 Keys: 28 [ENTER] 42 [GCF] -> 14 Ans: Width = 2x + 3 (Way 2: 14(..	#10*: A square garden has perimeter $(36x + 48)$ ft. Factor out 4 to find the length of 1 side! SC-6 Keys: 36 [ENTER] 4 [+]; 48 [ENTER] 4 [+] Ans: Side = 9x + 12 (4(9x + 12))		



Unit 5: Areas of Polygons & Elapsed Time — Complete Key

Big Ideas Math Grade 6 — Chapter 4 (Areas of Polygons) • Manipulative Kits: Counting & Array Tiles (COUNT-01) + Planetary Geared Clock (TIME-01)

Target Misconception: Students multiply the slanted side of a parallelogram instead of the vertical height, forget to divide by 2 for triangles, lose track of multi-piece composite areas, and subtract clock times in base-10 instead of base-60.

Hands-On Block Remediation: Slide the corner triangle of a parallelogram to form a straight [f] [RECT] rectangle, use the dedicated [g] [TRI] key ([g][7]) which divides by 2 automatically, accumulate composite chunks with [Σ+], and use the Planetary Clock (TIME-01) + [CLK] key for base-60 time.

Optional QUEST-01 Scoreboard: 1 '×10' block = Solved 1 Way; stack a 2nd '×10' block (×20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 5.1: AREAS OF PARALLELOGRAMS & RECTANGLES ([f] [RECT]) [COUNT-01]		Method: Parallelogram Cut-and-Slide Area Formula ($A = b \cdot h$) Using Perpendicu..	
#1: Find the area of a parallelogram with base $b = 15$ m, vertical height $h = 9$ m, and slanted side 11 m. SC-6 Keys: 15 [ENTER] 9 [f] [RECT] Ans: 135 m' (Ignore 11m!)	#2: Find the area of a rectangle measuring 18 ft by 12 ft using [f] [RECT]. SC-6 Keys: 18 [ENTER] 12 [f] [RECT] Ans: 216 ft'		
#3: Find the area of a parallelogram with $b = 8.5$ m and vertical height $h = 6.4$ m. SC-6 Keys: 8.5 [ENTER] 6.4 [f] [RECT] Ans: 54.4 m'	#4: Find the area of a square tile with side 13 cm. SC-6 Keys: 13 [x'] Ans: 169 cm'		
#5: A parallelogram has base $b = 6 \frac{1}{2}$ in and height $h = 4$ in. Find its area. SC-6 Keys: 6 [.] 1 [.] 2 [ENTER] 4 [f] [RECT] Ans: 26 in'	#6: Missing Height: A parallelogram has Area = 108 cm^2 and base $b = 12$ cm. Find h . SC-6 Keys: 108 [ENTER] 12 [÷] Ans: 9 cm		
#7: Missing Base: A parallelogram has Area = 135 ft^2 and vertical height $h = 7.5$ ft. Find b . SC-6 Keys: 135 [ENTER] 7.5 [÷] Ans: 18 ft	#8: Spot the Glitch: A parallelogram has $b = 10$, vertical $h = 6$, slanted side = 7.5. Sam got 75. Fix it! SC-6 Keys: 10 [ENTER] 6 [f] [RECT] Ans: 60 (Sam multiplied slanted..		
#9*: A slanted parking space has base 9 ft and straight length 18.5 ft. How much asphalt covers 4 spaces? SC-6 Keys: 9 [ENTER] 18.5 [f] [RECT] 4 [x] Ans: 666 ft' (Way 2: base 36 ×..	#10*: A rectangular patio ($15 \text{ ft} \times 12 \text{ ft}$) has a parallelogram planter ($b=4 \text{ ft}$, $h=3 \text{ ft}$) inside. Find the remaining patio.. SC-6 Keys: 15 [ENTER] 12 [f] [RECT] 4 [ENTER] 3 [. Ans: 168 ft' (Way 2: 180 - 12 =..		

SEC 5.2: AREAS OF TRIANGLES – HALF A RECTANGLE ([g] [TRI]) [COUNT-01]		Method: Triangle Area as Half of a Parallelogram/Rectangle ($A = \frac{1}{2} \cdot b \cdot h$) &..	
#1: Find the area of a triangle with base $b = 14$ ft and height $h = 18$ ft using [g] [TRI]. SC-6 Keys: 14 [ENTER] 18 [g] [TRI] Ans: 126 ft'	#2: Find the area of a right triangle with base 9 ft, vertical height 4 ft, and slanted hypotenuse 9.85 ft. SC-6 Keys: 9 [ENTER] 4 [g] [TRI] Ans: 18 ft' (Ignore 9.85!)		
#3: Find the area of a triangle with $b = 16$ cm and $h = 11$ cm. SC-6 Keys: 16 [ENTER] 11 [g] [TRI] Ans: 88 cm'	#4: Find the area of a triangle with decimal dimensions: $b = 12.5$ m, $h = 8.4$ m. SC-6 Keys: 12.5 [ENTER] 8.4 [g] [TRI] Ans: 52.5 m'		
#5: Find the area of a triangle with fractional dimensions: $b = 4 \frac{1}{2}$ in, $h = 6$ in. SC-6 Keys: 4 [.] 1 [.] 2 [ENTER] 6 [g] [TRI] Ans: 13 1/2 in' (13.5)	#6: Missing Height: A triangle has Area = 54 cm^2 and base $b = 12$ cm. (Double 54 first, then ÷ 12!) SC-6 Keys: 54 [ENTER] 2 [x] 12 [÷] Ans: 9 cm		
#7: Missing Base: A triangle has Area = 84 m^2 and height $h = 14$ m. Find base b . SC-6 Keys: 84 [ENTER] 2 [x] 14 [÷] Ans: 12 m	#8: Spot the Glitch: Leo found the area of a $b=8$, $h=5$ triangle as 40. What did he calculate instead? SC-6 Keys: 8 [ENTER] 5 [g] [TRI] Ans: 20 (40 is the full rectang..		
#9*: A sailboat has a main sail ($b=12 \text{ ft}$, $h=25 \text{ ft}$) and jib sail ($b=8 \text{ ft}$, $h=15 \text{ ft}$). Find total sail area 2 ways! SC-6 Keys: 12 [ENTER] 25 [g] [TRI] 8 [ENTER] 15 [Ans: 210 ft' (Way 2: (300+120)+..	#10*: A triangular gable window has Area = 36 ft^2 and base 9 ft. Find its height and check with [g] [TRI]! SC-6 Keys: 36 [ENTER] 2 [x] 9 [÷] Ans: 8 ft (Way 2: 9 [ENTER] 8 [..		

SEC 5.3: TRAPEZOIDS & COMPOSITE FIGURES WITH THE [Σ+] RUNNING LEDGER [COUNT-01]		Method: Trapezoid Area Formula $A = \frac{1}{2}h(b_1 + b_2)$ & Decomposing Composite Figure..	
#1: Find the area of a trapezoid with $b_1 = 10$ cm, $b_2 = 14$ cm, and $h = 6$ cm using (b_1+b_2) [ENTER] h [g] [TRI]. SC-6 Keys: 10 [ENTER] 14 [÷] 6 [g] [TRI] Ans: 72 cm'	#2: Find the area of a trapezoid with $b_1 = 18$ ft, $b_2 = 12$ ft, and $h = 9$ ft. SC-6 Keys: 18 [ENTER] 12 [÷] 9 [g] [TRI] Ans: 135 ft'		
#3: L-Shape Room: Split into Room A (10×6) and Room B (8×4). Sum with [Σ+] and [f] [Σx]. SC-6 Keys: 10 [ENTER] 6 [f] [RECT] [Σ+] 8 [ENTER] 4 [f] [RECT] [Σ+]. Ans: 92	#4: Banner Arrow: A 15×6 rectangle attached to a triangle ($b = 10$, $h = 6$). Find total area. SC-6 Keys: 15 [ENTER] 6 [f] [RECT] [Σ+] 10 [ENTER] 6 [g] [TRI] [Σ+] [. Ans: 120		
#5: Find the area of a trapezoid with decimal bases $b_1 = 8.5$ m, $b_2 = 5.5$ m, and $h = 4.2$ m. SC-6 Keys: 8.5 [ENTER] 5.5 [÷] 4.2 [g] [TRI] Ans: 29.4 m'	#6: Cutout Frame: A $10 \text{ in} \times 8 \text{ in}$ frame has a $6 \text{ in} \times 4 \text{ in}$ hole cut out. Use [Σ+] and [f] [Σ-] to find the border area! SC-6 Keys: 10 [ENTER] 8 [f] [RECT] [Σ+] 6 [ENTER] 4 [f] [RECT] [f] [Σ-]. Ans: 56 in'		
#7: Missing Trapezoid Height: A trapezoid has Area = 90 cm^2 and bases $b_1 = 11$ cm, $b_2 = 7$ cm. Find h . SC-6 Keys: 90 [ENTER] 2 [x] 11 [ENTER] 7 [÷] [÷] Ans: 10 cm	#8: A mini-golf hole is a 12×5 ft rectangle plus a trapezoid ($b_1=5$, $b_2=9$, $h=4$). Find total area. SC-6 Keys: 60 [Σ+] 5 [ENTER] 9 [÷] 4 [g] [TRI] [Σ+] [f] [Σx] Ans: 88 ft'		
#9*: Find the area of a trapezoid ($b_1=10$, $b_2=16$, $h=8$) both with the trapezoid formula AND by splitting into a $10 \times ..$ SC-6 Keys: 10 [ENTER] 16 [÷] 8 [g] [TRI] Ans: 104 (Way 2: 80 + 24 = 104)	#10*: A $20 \text{ ft} \times 15 \text{ ft}$ lawn has a triangular flowerbed ($b=8 \text{ ft}$, $h=6 \text{ ft}$) and square shed ($5 \text{ ft} \times 5 \text{ ft}$). Find grass area! SC-6 Keys: 300 [Σ+] 24 [f] [Σ-] 25 [f] [Σ-] [f] [Σx] Ans: 251 ft'		

SEC 5.4: COORDINATE POLYGONS & PLANETARY CLOCK BASE-60 TIME ([CLK]) [TIME-01]		Method: Polygons in the Coordinate Plane (Side Lengths via Coordinates) & Bas..	
#1: Find the distance between (3, 4) and (11, 4) on a coordinate grid. SC-6 Keys: 11 [ENTER] 3 [-] Ans: 8 units	#2: A rectangle has corners (1, 2), (10, 2), (10, 8), (1, 8). Find its area. SC-6 Keys: 10 [ENTER] 1 [-] 8 [ENTER] 2 [-] [f] [Σx] Ans: 54 sq units		
#3: In [CLK] mode, add 1 hr 45 min + 1 hr 35 min (1.45 [ENTER] 1.35 [+]). SC-6 Keys: [CLK] 1.45 [ENTER] 1.35 [+] Ans: 3 hr 20 min (3.20)	#4: Convert 2 hr 30 min (2.30) to decimal hours using [f] [->HR]. SC-6 Keys: 2.30 [f] [->HR] Ans: 2.5 hours		
#5: Convert 4 hr 45 min (4.45) to decimal hours using [f] [->HR]. SC-6 Keys: 4.45 [f] [->HR] Ans: 4.75 hours	#6: Convert 1.75 decimal hours back into Hours & Minutes using [g] [->HMS]. SC-6 Keys: 1.75 [g] [->HMS] Ans: 1 hr 45 min (1.45)		
#7: In [CLK] mode, find elapsed time from 8:50 AM to 11:25 AM (11.25 [ENTER] 8.50 [-]). SC-6 Keys: [CLK] 11.25 [ENTER] 8.50 [-] Ans: 2 hr 35 min (2.35)	#8: A right triangle on a grid has vertices (2, 1), (10, 1), and (2, 7). Find its area! SC-6 Keys: 8 [ENTER] 6 [g] [TRI] Ans: 24 sq units		
#9*: You tutor for 3 hr 15 min (3.15) at \$16/hr. Convert to decimal hours with [f] [->HR] and find your pay 2 ways! SC-6 Keys: 3.15 [f] [->HR] 16 [x] Ans: \$52.00 (Way 2: 3×16 + 4×16..	#10*: Coordinate Park: Vertices (2, 2), (14, 2), (14, 11), (2, 11) where 1 unit = 10 yd. Find perimeter and area! SC-6 Keys: 12 [ENTER] 9 [f] [RECT] Ans: P = 42 units (420 yd); A = ..		



Unit 6: Integers, Rational Numbers & The Coordinate Plane — Complete Key

Big Ideas Math Grade 6 — Chapter 6 • Manipulative Kits: Ten-Frame Bicolor Counters (BASE-10) + Number Rack (RACK-01)

Target Misconception: Students confuse the subtraction operator [-] with the negative sign [+/-], think $-18 > -5$ because $18 > 5$, confuse Opposite (+/-) with Absolute Value ([g] [|x|]), and reverse (x, y) coordinates.

Hands-On Block Remediation: Use Yellow (+1) and Red (-1) Zero-Pair counters, test inequalities with [f] [>] and [g] [<], contrast +/- (flip sign) with [g] [|x|] (always positive distance from 0), and use the Elevator Rule (walk across x first, ride up/down y second).

Optional QUEST-01 Scoreboard: 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!



SEC 6.1: POSITIVE & NEGATIVE INTEGERS – ZERO PAIRS & THE [+/-] SIGN FLIPPER [BASE-10]		Method: Positive & Negative Integers on a Number Line, Zero Pairs & Opposites..	
#1: Write the integer for '25 feet below sea level' and find its opposite using [+/-]. SC-6 Keys: 25 [+/-] -> -25; [+/-] -> 25 Ans: -25; Opposite = +25	#2: Find the opposite of -42, and then the opposite of the opposite (-[-(-42)]). SC-6 Keys: 42 [+/-] [+/-] [+/-] Ans: +42; and -42		
#3: Zero-Pair Cancellation: A submarine is at -18 m and rises +18 m. Where is it now? SC-6 Keys: 18 [+/-] [ENTER] 18 [+] Ans: 0 m (Sea level)	#4: Combine 6 Yellow (+1) counters and 6 Red (-1) counters. What is the value? SC-6 Keys: 6 [ENTER] 6 [+/-] [+] Ans: 0		
#5: A hiker starts at -120 ft in a canyon and climbs +120 ft. What is her elevation? SC-6 Keys: 120 [+/-] [ENTER] 120 [+] Ans: 0 ft	#6: What integer is its own opposite? Test 0 +/- on your SC-6! SC-6 Keys: 0 [+/-] Ans: 0		
#7: Temperature starts at 0°F, drops 12°F (12 +/-), and rises 19°F. Find the temperature. SC-6 Keys: 12 [+/-] [ENTER] 19 [+] Ans: +7°F	#8: Golf Par: -3 means 3 strokes under par. If you shoot -3 on Saturday and +3 on Sunday, what is your total? SC-6 Keys: 3 [+/-] [ENTER] 3 [+] Ans: 0 (Even par)		
#9*: Elevator starts at Floor 0, goes up 14, down 20 (20 +/-), and up 9. Find the floor 2 ways! SC-6 Keys: 14 [ENTER] 20 [+/-] [+] Ans: Floor 3 (Way 2: (14+9) - 2..)	#10*: Game XP: You gain 40 XP, lose 65 XP, and gain 25 XP. Did you break even? Prove 2 ways! SC-6 Keys: 40 [ENTER] 65 [+/-] [+] Ans: 0 XP (Break even! 40+25 = ..)		

SEC 6.2: COMPARING & ORDERING INTEGERS AND RATIONAL NUMBERS [RACK-01]		Method: Comparing & Ordering Integers, Decimals, and Fractions on a Number Li..	
#1:	Which temperature is warmer (greater): -12°C or -5°C? Test with [g] [<]. SC-6 Keys: 12 [+/-] [ENTER] 5 [+/-] [g] [<] Ans: -5°C (-12 < -5)	#2:	Compare -9 and -2 using > or <. SC-6 Keys: 9 [+/-] [ENTER] 2 [+/-] [g] [<] Ans: -9 < -2
#3:	Compare -15 and 0 using > or <. SC-6 Keys: 15 [+/-] [ENTER] 0 [g] [<] Ans: -15 < 0	#4:	Order the integers from least to greatest: 4, -7, 0, -2, -10. SC-6 Keys: Left-to-right on number line Ans: -10, -7, -2, 0, 4
#5:	Compare -3/4 and -0.6. (Hint: -3/4 = -0.75. Which is further right?) SC-6 Keys: 0.75 [+/-] [ENTER] 0.6 [+/-] [g] [<] Ans: -3/4 < -0.6 (-0.6 is great..)	#6:	Compare -2 1/2 and -2.3 using > or <. SC-6 Keys: 2.5 [+/-] [ENTER] 2.3 [+/-] [g] [<] Ans: -2 1/2 < -2.3
#7:	Compare -5/8 and -7/8. SC-6 Keys: .5 [.] 8 [+/-] [ENTER] .7 [.] 8.. Ans: -5/8 > -7/8	#8:	Spot the Glitch: Leo says -4.5 > -4.1 because 4.5 > 4.1. Explain why -4.1 is actually greater! SC-6 Keys: 4.5 [+/-] [ENTER] 4.1 [+/-] [g] [<] Ans: -4.1 is closer to 0 (furth..)
#9*:	Order -1.5, 1 1/4, -1 3/4, and -0.5 from least to greatest. Verify both as decimals AND with [g] [<]! SC-6 Keys: -1.75, -1.5, -0.5, 1.25 Ans: -1 3/4, -1.5, -0.5, 1 1/4	#10*:	Three divers are at -14.8 m, -14 1/2 m, and -15.2 m. Who is deepest (least) and who is shallowest (greatest). SC-6 Keys: -15.2 < -14.8 < -14.5 Ans: Deepest: -15.2 m; Shallow..

SEC 6.3: ABSOLUTE VALUE — DISTANCE FROM ZERO IS ALWAYS POSITIVE ([g] [x]) [RACK-01]		Method: Absolute Value x as Distance from Zero (Always Non-Negative) & Eval..
#1: Find -27 using [g] [x]. SC-6 Keys: 27 [+/-] [g] [x] Ans: 27	#2: Evaluate -27 + 13 . SC-6 Keys: 27 [+/-] [g] [x] [ENTER] 13 [+] Ans: 40	
#3: Evaluate -4.8 + -3.2 . SC-6 Keys: 4.8 [+/-] [g] [x] [ENTER] 3.2 [+/-].. Ans: 8.0	#4: Evaluate -35 - -19 . SC-6 Keys: 35 [+/-] [g] [x] [ENTER] 19 [+/-] [g].. Ans: 16	
#5: Compare -12 and 9 using > or <. (Which is further from 0?) SC-6 Keys: 12 > 9 Ans: -12 > 9 (12 > 9)	#6: Evaluate -24 . (Find -24 first, then press +/- for the outside minus!) SC-6 Keys: 24 [+/-] [g] [x] [+/-] Ans: -24	
#7: Evaluate 50 - -18 . Find -18 first, then subtract from 50. SC-6 Keys: 50 [ENTER] 18 [+/-] [g] [x] [-] Ans: 32	#8: Order from least to greatest: -8 , -6, -3 , 0, - -9 . SC-6 Keys: Values: 8, -6, 3, 0, -9 Ans: - -9 , -6, 0, -3 , -8 	
#9*: A diver is at -32 ft and a seagull is at +25 ft. Which is closer to sea level (0), and by how many feet? SC-6 Keys: 32 [+/-] [g] [x] [ENTER] 25 [-] Ans: Seagull is closer by 7 ft..	#10*: Two accounts have balances of -\$45 and -\$28. Which account has the greater debt (-45 vs -28), and whi.. SC-6 Keys: -45 =45 > -28 =28 Ans: Greater debt: -\$45 (\$45);..	

SEC 6.4: THE 4-QUADRANT COORDINATE PLANE & AXIS REFLECTIONS [COUNT-01]		Method: Plotting (x, y) in All Four Quadrants (I, II, III, IV) & Reflecting A...	
#1:	Name the Quadrant (I, II, III, or IV) for point (7, -4). SC-6 Keys: (+, -) -> Right, Down Ans: Quadrant IV	#2:	Name the Quadrant for point (-9, -2). SC-6 Keys: (-, -) -> Left, Down Ans: Quadrant III
#3:	Name the Quadrant for point (-5, 11). SC-6 Keys: (-, +) -> Left, Up Ans: Quadrant II	#4:	Reflect (6, 9) across the y-axis. (Flip the x-coordinate with [+/-]) SC-6 Keys: 6 [+/-] -> -6 Ans: (-6, 9)
#5:	Reflect (6, 9) across the x-axis. (Flip the y-coordinate with [+/-]) SC-6 Keys: 9 [+/-] -> -9 Ans: (6, -9)	#6:	Reflect (-3, -7) across the x-axis. SC-6 Keys: 7 [+/-] [+/-] -> +7 Ans: (-3, 7)
#7:	Reflect (-8, 4) across the y-axis, and then across the x-axis. SC-6 Keys: Flip x -> (8,4); flip y -> (8,-4) Ans: (8, -4)	#8:	On the Fence: Which axis does (0, -9) sit on, and which axis does (-7, 0) sit on? SC-6 Keys: 0 sideways vs 0 up/down Ans: (0,-9) on y-axis; (-7,0) o...
#9*:	Start at (4, -5). Walk 7 units left and 8 units up. Where do you land, and in which quadrant? SC-6 Keys: 4 [ENTER] 7 [-]; 5 [+/-] [ENTER] 8 [+] Ans: (-3, 3) in Quadrant II	#10*:	Points A(-4, 2), B(4, 2), and C(4, -5) are 3 corners of a rectangle. Find the 4th corner D! SC-6 Keys: Match x of A (-4) & y of C (-5) Ans: D(-4, -5) in Quadrant III

SEC 6.5: DISTANCE BETWEEN POINTS ON THE COORDINATE PLANE ([G] [X]) [COUNT-01]		Method: Finding Horizontal & Vertical Distances on the Coordinate Plane Using..	
#1:	Find the horizontal distance between (-8, 5) and (11, 5). SC-6 Keys: 8 [+/-] [ENTER] 11 [-] [g] [x] Ans: 19 units	#2:	Find the vertical distance between (-3, -4) and (-3, -15). SC-6 Keys: 4 [+/-] [ENTER] 15 [+/-] [-] [g] [x] Ans: 11 units
#3:	Find the vertical distance between (7, 9) and (7, -6). SC-6 Keys: 9 [ENTER] 6 [+/-] [-] [g] [x] Ans: 15 units	#4:	Find the horizontal distance between (-14, 2) and (-5, 2). SC-6 Keys: 14 [+/-] [ENTER] 5 [+/-] [-] [g] [x] Ans: 9 units
#5:	Find the distance between (-3.5, 4) and (6.5, 4). SC-6 Keys: 3.5 [+/-] [ENTER] 6.5 [-] [g] [x] Ans: 10 units	#6:	Find the distance between (2, -4 1/2) and (2, 3 1/2). SC-6 Keys: 4.5 [+/-] [ENTER] 3.5 [-] [g] [x] Ans: 8 units
#7:	A line segment starts at (-6, 3) and goes 10 units right. What are the coordinates of the right endpoint? SC-6 Keys: 6 [+/-] [ENTER] 10 [+] Ans: (4, 3)	#8:	Spot the Glitch: For (-5, 2) to (8, 2), Sam subtracted 8 - 5 = 3. Why is the distance 13, not 3? SC-6 Keys: 5 [+/-] [ENTER] 8 [-] [g] [x] Ans: 13 units (They are on oppo..)
#9*:	A treasure map rectangle has corners (-4, 6), (5, 6), (5, -2), (-4, -2). Find its perimeter & area 2 ways! SC-6 Keys: Width 9, Height 8 Ans: Perimeter = 34, Area = 72	#10*:	On a city grid (1 unit = 0.5 mile), you walk from (-6, -2) to (-6, 8) to (4, 8). How many miles did you walk? SC-6 Keys: 10 + 10 = 20 units x 0.5 Ans: 20 units = 10 miles



Unit 7: Equations & Inequalities — Complete Key

Big Ideas Math Grade 6 — Chapter 7 • Manipulative Kits: Algebra Boxes & Stage (ALGB-01) + Number Rack (RACK-01)

Target Misconception: Students treat '=' as 'write the answer', translate '8 less than n' backwards as $8 - n$, resent writing -14 under both sides of $x + 14 = 39$, and confuse open vs. solid inequality circles.**Hands-On Block Remediation:** Model '=' as a Balance Scale using Algebra Boxes & Stage (ALGB-01). Solve 1-step equations with inverse operations on both sides and check the answer with [f] [LASTX], and test inequalities with [f] [≥] and [g] [≤].**Optional QUEST-01 Scoreboard:** 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!

SEC 7.1: WRITING EQUATIONS & TESTING SOLUTIONS — THE BALANCE SCALE RULE [ALGB-01]		Method: Writing Equations in One Variable & Testing Solutions by Substitution..	
#1:	Test whether $x = 6$ or $x = 8$ solves $5x - 7 = 33$. SC-6 Keys: 5 [ENTER] 8 [×] 7 [-] Ans: $x = 8$ (5(8)-7 = 33)	#2:	Test whether $y = 12$ or $y = 15$ solves $y/3 + 4 = 9$. SC-6 Keys: 15 [ENTER] 3 [+] 4 [+] Ans: $y = 15$ (15/3 + 4 = 9)
#3:	Translate into an equation: 'The sum of a number x and 14 is 52.' SC-6 Keys: $x + 14 = 52$ Ans: $x + 14 = 52$ ($x = 38$)	#4:	Translate into an equation: '6 times a number k equals 84.' SC-6 Keys: $6k = 84$ Ans: $6k = 84$ ($k = 14$)
#5:	Translate: '9 less than a number w is 17.' (Watch the order!) SC-6 Keys: $w - 9 = 17$ Ans: $w - 9 = 17$ ($w = 26$)	#6:	Translate: 'The quotient of a number m and 5 is 13.' SC-6 Keys: $m / 5 = 13$ Ans: $m/5 = 13$ ($m = 65$)
#7:	4 pizza pies (p) plus a \$6 delivery fee total \$54. Write the equation and test $p = 12$! SC-6 Keys: 4 [ENTER] 12 [×] 6 [+] Ans: $4p + 6 = 54$; $p = 12$	#8:	Spot the Glitch: For '12 less than x is 20', Sam wrote $12 - x = 20$. Fix the equation and solve! SC-6 Keys: $x - 12 = 20$ Ans: $x - 12 = 20$ ($x = 32$)
#9*:	A streaming pass costs \$10 plus \$3 per movie ($10 + 3m = 28$). Find m by testing AND by undoing! SC-6 Keys: 28 [ENTER] 10 [-] 3 [+] Ans: $m = 6$ movies (10 + 3(6) = ..	#10*:	Three friends split a restaurant bill b equally and each pays \$14.50. Write the equation and find b ! SC-6 Keys: 14.50 [ENTER] 3 [×] Ans: $b/3 = 14.50$; $b = \$43.50$

SEC 7.2: SOLVING ONE-STEP ADDITION & SUBTRACTION EQUATIONS ([f] [LASTX]) [ALGB-01]		Method: Subtraction & Addition Properties of Equality (Inverse Operations on..	
#1:	Solve $x + 28 = 73$ and prove with [f] [LASTX] [+]. SC-6 Keys: 73 [ENTER] 28 [-] Ans: $x = 45$	#2:	Solve $y - 34 = 58$ and prove with [f] [LASTX] [-]. SC-6 Keys: 58 [ENTER] 34 [+] Ans: $y = 92$
#3:	Solve $19 + n = 64$. SC-6 Keys: 64 [ENTER] 19 [-] Ans: $n = 45$	#4:	Solve $k - 47 = 29$. SC-6 Keys: 29 [ENTER] 47 [+] Ans: $k = 76$
#5:	Solve $w - 19.6 = 34.8$. SC-6 Keys: 34.8 [ENTER] 19.6 [+] Ans: $w = 54.4$	#6:	Solve $p + 8.75 = 25.4$. SC-6 Keys: 25.4 [ENTER] 8.75 [-] Ans: $p = 16.65$
#7:	Solve $m + 3/8 = 5/6$ on your SC-6 and check with [f] [LASTX] [+]. SC-6 Keys: [.] 5 [.] 6 [ENTER] [.] 3 [.] 8 [-] Ans: $m = 11/24$	#8:	Solve $a - 1 1/4 = 3 1/2$. SC-6 Keys: 3 [.] 1 [.] 2 [ENTER] 1 [.] 1 [.] 4 [+] Ans: $a = 4 3/4$
#9*:	After spending \$18.50 on a controller skin, you have \$26.75 left ($m - 18.50 = 26.75$). Find starting money m ! SC-6 Keys: 26.75 [ENTER] 18.50 [+] Ans: \$45.25 (Check: 45.25 - 18...	#10*:	A drone climbs 42.5 ft to reach 110 ft ($h + 42.5 = 110$). Find its starting height h and prove with [f] [LASTX]! SC-6 Keys: 110 [ENTER] 42.5 [-] Ans: 67.5 ft (Check: 67.5 + 42...

SEC 7.3: SOLVING ONE-STEP MULTIPLICATION & DIVISION EQUATIONS [ALGB-01]		Method: Division & Multiplication Properties of Equality & Reciprocal Multipl..	
#1:	Solve $8x = 136$ and prove with [f] [LASTX] [×]. SC-6 Keys: 136 [ENTER] 8 [+] Ans: $x = 17$	#2:	Solve $12y = 180$ and prove with [f] [LASTX] [×]. SC-6 Keys: 180 [ENTER] 12 [+] Ans: $y = 15$
#3:	Solve $m / 6 = 19$ and prove with [f] [LASTX] [+]. SC-6 Keys: 19 [ENTER] 6 [×] Ans: $m = 114$	#4:	Solve $k / 7 = 14.5$. SC-6 Keys: 14.5 [ENTER] 7 [×] Ans: $k = 101.5$
#5:	Solve $4.5w = 63$. SC-6 Keys: 63 [ENTER] 4.5 [+] Ans: $w = 14$	#6:	Solve $3/4 x = 18$. SC-6 Keys: 18 [ENTER] [.] 3 [.] 4 [+] Ans: $x = 24$
#7:	Solve $2/5 n = 16$ using BOTH [+ and [f] [1/X] [×]. SC-6 Keys: 16 [ENTER] [.] 2 [.] 5 [+] Ans: $n = 40$	#8:	Solve $5/6 p = 2/3$. SC-6 Keys: [.] 2 [.] 3 [ENTER] [.] 5 [.] 6 [+] Ans: $p = 4/5$ (0.8)
#9*:	A 3D printer prints at 1.5 cm/min. How long (t) to print a 27 cm tower ($1.5t = 27$)? Solve & prove! SC-6 Keys: 27 [ENTER] 1.5 [+] Ans: 18 minutes (Check: 18 × 1...	#10*:	3/5 of the students in a club ($3/5 s = 27$) are 6th graders. How many total students s are in the club? SC-6 Keys: 27 [ENTER] [.] 3 [.] 5 [+] Ans: 45 students (Way 2: 27 ÷ 3...

SEC 7.4: WRITING, GRAPHING & SOLVING INEQUALITIES ([f] [>], [g] [<], [f] [≥], [g] [≤]) [..		Method: Writing, Graphing & Solving 1-Step Inequalities (Open Circle <, > vs...	
#1:	Solve $x + 8 > 21$. Tell whether the circle at 13 is Open or Solid, and arrow direction. SC-6 Keys: 21 [ENTER] 8 [-] Ans: $x > 13$ (Open circle, arrow..	#2:	Solve $y - 9 \leq 15$. Tell whether the circle at 24 is Open or Solid, and arrow direction. SC-6 Keys: 15 [ENTER] 9 [+] Ans: $y \leq 24$ (Solid dot, arrow L..
#3:	Solve $6n \geq 78$. Tell whether the circle at 13 is Open or Solid, and arrow direction. SC-6 Keys: 78 [ENTER] 6 [+] Ans: $n \geq 13$ (Solid dot, arrow R..	#4:	Solve $m / 4 < 9$. Tell whether the circle at 36 is Open or Solid, and arrow direction. SC-6 Keys: 9 [ENTER] 4 [×] Ans: $m < 36$ (Open circle, arrow..
#5:	Translate: 'You must be at least 48 inches tall (h) to ride.' Write the inequality! SC-6 Keys: 'At least' = $\geq$ Ans: $h \geq 48$	#6:	Translate: 'An elevator holds at most 2,000 pounds (w). Write the inequality! SC-6 Keys: 'At most' = $\leq$ Ans: $w \leq 2000$
#7:	Which numbers from {4, 5, 6} are solutions to $4n + 3 > 23$? Test on your SC-6! SC-6 Keys: 4(5)+3=23 (False); 4(6)+3=27 (True) Ans: Only 6 (At n=5, 23 > 23 is..	#8:	Which numbers from {4, 5, 6} are solutions to $4x - 3 \geq 17$? SC-6 Keys: 4(5)-3=17 ≥ 17 (1=True) Ans: 5 and 6
#9*:	You have \$50 to buy \$8 books ($8b \leq 50$). Solve with [g] [+R] to find the max whole books b you can buy! SC-6 Keys: 50 [ENTER] 8 [g] [+R] Ans: At most 6 books (#2 left o..	#10*:	A gamer needs at least 500 points ($p + 340 \geq 500$). Solve for p AND test $p = 160$ with [f] [≥]! SC-6 Keys: 500 [ENTER] 340 [-] Ans: $p \geq 160$ (340+160=500 ≥ 500..

SEC 7.5: TWO-VARIABLE RELATIONSHIPS (Y = KX AND Y = X + B) — TABLES & GRAPHS [COUNT-01]		Method: Independent (Input x) & Dependent (Output y) Variables — Multipl...	
#1:	Table has (1, 8), (2, 16), (3, 24). Write the equation and find y when $x = 10$. SC-6 Keys: 16 [ENTER] 2 [+] -> 8; 8×10 Ans: $y = 8x$; $y = 80$	#2:	Table has (1, 9), (2, 10), (5, 13). Write the equation and find y when $x = 20$. SC-6 Keys: 9 [ENTER] 1 [-] -> +8; 20+8 Ans: $y = x + 8$; $y = 28$
#3:	Table has (2, 14), (5, 35), (8, 56). Write the equation and find y when $x = 12$. SC-6 Keys: 14 [ENTER] 2 [+] -> 7; 7×12 Ans: $y = 7x$; $y = 84$	#4:	Table has (10, 6), (15, 11), (22, 18). Write the equation and find y when $x = 30$. SC-6 Keys: 30 [ENTER] 4 [-] Ans: $y = x - 4$; $y = 26$
#5:	Use 6 [g] [REP] [+] to generate the y -values of $y = 6x$ for $x = 1, 2, 3, 4$. SC-6 Keys: 6 [g] [REP] [+] [+] Ans: (1,6), (2,12), (3,18), (4,..	#6:	In $d = 65t$ (distance d in miles after t hours), which variable is Independent and which is Dependent? SC-6 Keys: d depends on t Ans: Independent: t ; Dependent: d
#7:	Using $d = 65t$, how far does the car travel in 4.5 hours? SC-6 Keys: 65 [ENTER] 4.5 [×] Ans: 292.5 miles	#8:	Does the graph of $y = 4x$ pass through the origin (0, 0)? What about $y = x + 4$? SC-6 Keys: Test $x = 0$ in both! Ans: $y = 4x$ hits (0,0); $y = x + ..$
#9*:	You earn $p = 12.50/h$. How many hours h must you work to earn \$100? Solve by division AND ratio doubling! SC-6 Keys: 100 [ENTER] 12.50 [+] Ans: 8 hours (Way 2: 1h=12.5 ->..	#10*:	A gym charges a \$25 signup fee plus \$15 per month (m). Write the equation for total cost c and find c for 12.. SC-6 Keys: 15 [ENTER] 12 [×] 25 [+] Ans: $c = 15m + 25$; \$205 for 12..



Unit 8: Surface Area & Volume of 3D Solids — Complete Key

Big Ideas Math Grade 6 — Chapter 8 • Manipulative Kits: Counting & Array Tiles (COUNT-01) + Gridfinity 3x1 Storage Boxes

Target Misconception: Students drop one of the 6 faces when finding rectangular prism surface area, tangle prism and pyramid formulas, and confuse 2D Surface Area (cardboard outside) with 3D Volume (cubes inside).**Hands-On Block Remediation:** Have students touch the 3 pairs of faces on their physical Gridfinity box while logging each pair into [Σ+] (n=1, 2, 3), use [f] [PRISM] ([f][9]) to multiply 3 stack floors (l, w, h) at once for volume, and unlock [f] [CIRC], [g] [CONE], and [g] [HYP].**Optional QUEST-01 Scoreboard:** 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!

SEC 8.1: 3D SOLIDS, NETS & SURFACE AREA OF RECTANGULAR PRISMS ([f] [RECT] + [Σ+]) [COUNT-01]		Method: Unfolding 3D Prisms into 2D Nets – Sum of 6 Rectangular Faces SA = 2(…	
#1: Find the surface area of a cube with edge length s = 4 cm (6s²). SC-6 Keys: 4 [x²] 6 [x] Ans: 96 cm²	#2: Find the surface area of a cube with edge length s = 9 in. SC-6 Keys: 9 [x²] 6 [x] Ans: 486 in²		
#3: Find the surface area of a 6 cm by 4 cm by 3 cm rectangular prism using the 3-pair [Σ+] ledger. SC-6 Keys: 2(24)+2(18)+2(12) Ans: 108 cm²	#4: Find the surface area of a 10 in by 5 in by 2 in rectangular box. SC-6 Keys: 2(50)+2(20)+2(10) Ans: 160 in²		
#5: Find the surface area of a prism with l = 12 ft, w = 8 ft, and h = 5 ft. SC-6 Keys: 2(96)+2(60)+2(40) Ans: 392 ft²	#6: Find the surface area of a prism with decimal edges: 5 m by 4 m by 2.5 m. SC-6 Keys: 2(20)+2(12.5)+2(10) Ans: 85 m²		
#7: A cube has a total surface area of 150 cm². What is the area of 1 face, and what is the edge length s? SC-6 Keys: 150 [ENTER] 6 [÷] [f] [√x] Ans: 1 face = 25 cm²; s = 5 cm	#8: Spot the Glitch: For a 5×4×3 box, Leo added 20 + 15 + 12 = 47. What did he forget to do? SC-6 Keys: 47 [ENTER] 2 [x] Ans: 94 (He only found 3 faces;…		
#9*: An open-top 3D-printed bin is 10 cm long, 8 cm wide, and 5 cm tall (NO lid!). Find its outer surface area 2 w.. SC-6 Keys: 80 + 2(50) + 2(40) Ans: 260 cm² (Way 2: Full box 3..	#10*: You wrap a gift box (15 in × 10 in × 4 in). If you have 550 in² of wrapping paper, is it enough? SC-6 Keys: 2(150)+2(60)+2(40) Ans: 500 in² needed -> Yes, 50..		

SEC 8.2: SURFACE AREA OF TRIANGULAR PRISMS & PYRAMIDS ([f] [RECT] + [g] [TRI] + [Σ+]) [COUNT-01]		Method: 2D Nets of Triangular Prisms (2 Triangles + 3 Rectangles) & Square Py..	
#1: Square Pyramid: Base is 6 cm × 6 cm; 4 triangles each have b = 6 cm, slant height = 5 cm. Find SA. SC-6 Keys: 6 [x²] 6 [ENTER] 5 [g] [TRI] 4 [x] [÷] Ans: 96 cm²	#2: Square Pyramid: Base is 8 in × 8 in; 4 triangles each have b = 8 in, slant height = 10 in. Find SA. SC-6 Keys: 8 [x²] 8 [ENTER] 10 [g] [TRI] 4 [x] [÷] Ans: 224 in²		
#3: Square Pyramid: Base is 12 ft × 12 ft; 4 triangles each have b = 12 ft, slant height = 9 ft. Find SA. SC-6 Keys: 12 [x²] 12 [ENTER] 9 [g] [TRI] 4 [x] [÷] Ans: 360 ft²	#4: Regular Tetrahedron: Made of 4 identical equilateral triangles (b = 6 cm, h = 5.2 cm). Find total SA. SC-6 Keys: 6 [ENTER] 5.2 [g] [TRI] 4 [x] Ans: 62.4 cm²		
#5: Triangular Prism: 2 triangle ends (b=4, h=3) + 3 rectangles of length 10 (widths 3, 4, 5). Find SA. SC-6 Keys: 4 [ENTER] 3 [g] [TRI] 2 [x] (12) + 12x.. Ans: 132	#6: Triangular Prism Tent: 2 triangle ends (b=8 ft, h=3 ft) + 3 rectangles of length 7 ft (widths 5, 5, 8 ft). SC-6 Keys: 8 [ENTER] 3 [g] [TRI] 2 [x] (24) + 18x.. Ans: 150 ft²		
#7: A regular tetrahedron has 4 identical triangles with b = 8 cm and h = 6.93 cm. Find its surface area. SC-6 Keys: 8 [ENTER] 6.93 [g] [TRI] 4 [x] Ans: 110.88 cm²	#8: How many faces (triangles and rectangles) does a Triangular Prism have vs. a Square Pyramid? SC-6 Keys: Count net faces Ans: Prism: 2 tris + 3 rects; P..		
#9*: Camping Tent (Triangular Prism): 2 ends (b=6 ft, h=4 ft), floor (6×8 ft), and 2 roof sides (5×8 ft each). Find t.. SC-6 Keys: 24 + 48 + 80 Ans: 152 ft² (Way 2: 24 + (6+5+..	#10*: A glass pyramid skylight has NO bottom floor—only 4 triangular glass panes (b = 9 ft, slant h = 6 ft). Find gl.. SC-6 Keys: 9 [ENTER] 6 [g] [TRI] 4 [x] Ans: 108 ft² (Way 2: 27 + 27 +..		

SEC 8.3: VOLUME OF RECTANGULAR PRISMS WITH WHOLE & FRACTIONAL EDGES ([f] [PRISM]) [COUNT-01]		Method: Base-Layer Volume Stacking (V = B · h = l · w · h) with Whole, Fracti..	
#1: Use [f] [PRISM] to find the volume of a box measuring 10 cm by 6 cm by 4 cm. SC-6 Keys: 10 [ENTER] 6 [ENTER] 4 [f] [PRISM] Ans: 240 cm³	#2: Find the volume of a cube with edge length 5 in using [g] [x³] or [f] [PRISM]. SC-6 Keys: 5 [g] [x³] Ans: 125 in³		
#3: Find the volume of a crate measuring 15 ft by 8 ft by 6 ft. SC-6 Keys: 15 [ENTER] 8 [ENTER] 6 [f] [PRISM] Ans: 720 ft³	#4: A prism has Base Area B = 32 m² and height h = 7 m. Find its volume. SC-6 Keys: 32 [ENTER] 7 [x] Ans: 224 m³		
#5: Fractional Edges: Find the volume of a fish tank 3 1/2 ft long, 1 1/2 ft wide, and 2 ft tall. SC-6 Keys: 3.5 [ENTER] 1.5 [ENTER] 2 [f] [PRISM] Ans: 10 1/2 ft³ (10.5)	#6: Fractional Edges: Find the volume of a block 4 1/2 in by 3 in by 2 in. SC-6 Keys: 4.5 [ENTER] 3 [ENTER] 2 [f] [PRISM] Ans: 27 in³		
#7: Missing Height: A box has Volume = 270 in³, length = 9 in, and width = 5 in. Find height h. SC-6 Keys: 270 [ENTER] 9 [ENTER] 5 [x] [÷] Ans: 6 in	#8: How many 1/2-inch mini-cubes fit inside 1 cubic inch? (Compute 2³!) SC-6 Keys: 2 [g] [x³] Ans: 8 mini-cubes per 1 in³		
#9*: A planter has Base Area 45 in² (9×5) and Volume 360 in³. Find depth h by division AND verify with [f] [PRIS.. SC-6 Keys: 360 [ENTER] 45 [÷] Ans: 8 in (Check: 9 [ENTER] 5 [..	#10*: How many 1/2-inch cubes fit inside a box with volume 27 in³? (Multiply 27 by 2³ = 8!) SC-6 Keys: 27 [ENTER] 2 [g] [x³] [x] Ans: 216 half-inch cubes		

SEC 8.4: CIRCLES, CONES & RIGHT-TRIANGLE HYPOTENUSE ([÷], [f] [CIRC], [g] [CONE], [g] [HYP]) [COUNT-01]		Method: Circle Area (A = πr²) & Circumference (C = 2πr), Cone Volume (V = 1/3πr²h) & Right-Triangle Hypot..	
#1: Find the area of a circle with radius r = 5 cm using [f] [CIRC]. SC-6 Keys: 5 [f] [CIRC] Ans: 78.54 cm²	#2: Find the area of a circle with radius r = 10 in using [f] [CIRC]. SC-6 Keys: 10 [f] [CIRC] Ans: 314.16 in²		
#3: Find the hypotenuse of a right triangle with legs a = 3 and b = 4 using [g] [HYP]. SC-6 Keys: 3 [ENTER] 4 [g] [HYP] Ans: 5	#4: Find the hypotenuse of a right triangle with legs a = 6 ft and b = 8 ft using [g] [HYP]. SC-6 Keys: 6 [ENTER] 8 [g] [HYP] Ans: 10 ft		
#5: Find the hypotenuse of a skate ramp with base 12 ft and back height 5 ft using [g] [HYP]. SC-6 Keys: 12 [ENTER] 5 [g] [HYP] Ans: 13 ft	#6: A circle has diameter d = 16 m. Divide by 2 to find radius r, then press [f] [CIRC]! SC-6 Keys: 16 [ENTER] 2 [÷] [f] [CIRC] Ans: 201.06 m²		
#7: Find the volume of a cone with radius r = 3 cm and height h = 12 cm using [g] [CONE]. SC-6 Keys: 3 [ENTER] 12 [g] [CONE] Ans: 113.10 cm³	#8: Find the volume of a cone with radius r = 6 in and height h = 5 in using [g] [CONE]. SC-6 Keys: 6 [ENTER] 5 [g] [CONE] Ans: 188.50 in³		
#9*: Find the volume of a cone (r = 3 cm, h = 10 cm) both with [g] [CONE] AND via 3 [f] [CIRC] 10 [x] 3 [÷]! SC-6 Keys: 3 [ENTER] 10 [g] [CONE] Ans: 94.25 cm³ (Both ways match..	#10*: TV screens are measured along the diagonal. A screen is 32 in wide and 24 in tall. Find its diagonal size 2.. SC-6 Keys: 32 [ENTER] 24 [g] [HYP] Ans: 40-inch screen (Way 2: √(1..		



Unit 9: Statistical Measures & Data Displays — Complete Key

Big Ideas Math Grade 6 — Chapters 9 & 10 (Statistical Measures and Data Displays) • Manipulative Kits: Counting & Array Tiles (COUNT-01) + Probability Dice Studio (PROB-01)

Target Misconception: Students forget to sort data before finding Median/Quartiles, lose their place adding long lists for Mean, and dread Mean Absolute Deviation (MAD) because doing it by hand takes 20 minutes of subtraction.**Hands-On Block Remediation:** Show that Mean is physically leveling unequal cube towers to the same height. Then show that entering a list ONCE with [Σ+] unlocks Mean ([g] [x-bar]), Median ([f] [MED]), Mode ([g] [MODE]), Range ([RNG]), Quartiles ([f] [1Q], [g] [3Q], [IQR]), and MAD ([g] [MAD]) in 1 click each!**Optional QUEST-01 Scoreboard:** 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!

SEC 9.1: DOT PLOTS, FREQUENCY & MEAN AS 'FAIR SHARE LEVELING' ([Σ+], [G] [x-bar]) [COUNT-01]		Method: Statistical Questions, Dot Plot Frequencies & Fair-Share Leveling for the Mean ($x\text{-bar} = \Sigma x \div n$) E..	
#1: Level the towers 2, 4, 6, 8. Find the sum ([f] [Σx]) and Mean ([g] [x-bar]). SC-6 Keys: [g][CLΣ] 2 [Σ+] 4 [Σ+] 6 [Σ+] 8 [Σ+] [g][x-bar] Ans: Sum = 20, Mean = 5	#2: Find the sum and Mean of: 12, 15, 18, 11, 14. SC-6 Keys: Load 5 nums into [Σ+] -> [g][x-bar] Ans: Sum = 70, Mean = 14		
#3: Find the Mean of your 5 gaming scores: 18, 24, 15, 27, 21. SC-6 Keys: Load into [Σ+] -> [g][x-bar] Ans: Mean = 21	#4: Find the Mean of these 4 decimal weights (g): 4.2, 3.8, 4.5, 3.5. SC-6 Keys: Load into [Σ+] -> [g][x-bar] Ans: Mean = 4.0 g		
#5: Typo Rescue: Enter 10 [Σ+] 20 [Σ+] 35 [Σ+], then remove 35 with 35 [f] [Σ-] and add 25 [Σ+]. Find [g] [x-bar]! SC-6 Keys: ... 35 [f][Σ-] 25 [Σ+] [g][x-bar] Ans: Sum = 55, Mean = 18.33	#6: Frequency Shortcut ([FRQ]): If 10 appears 4 times and 20 appears 2 times, find the Mean of all 6 numbers! SC-6 Keys: 10 [ENTER] 4 [FRQ] 20 [ENTER] 2 [FRQ].. Ans: 13.33 (80 ÷ 6)		
#7: Find the Mean daily high temperature (°F): 68, 72, 75, 71, 64, 70. SC-6 Keys: Load 6 temps into [Σ+] -> [g][x-bar] Ans: 70°F	#8: If 5 towers have a Mean height of 12 blocks, how many total blocks are in all 5 towers combined? SC-6 Keys: 5 [ENTER] 12 [×] Ans: 60 total blocks		
#9*: You need a Mean of 90 across 4 quizzes (360 pts). Your first 3 are 85, 92, 88. Find Quiz 4 score 2 ways! SC-6 Keys: 360 [ENTER] 265 [-] Ans: 95 (Way 2: (-5)+(+2)+(-2)=..	#10*: 6 players have a Mean score of 15 pts (90 pts). A 7th player scores 29 pts. What is the new Mean of all 7? SC-6 Keys: 90 [ENTER] 29 [+] 7 [÷] Ans: 17 points		

SEC 9.2: MEDIAN, MODE & RANGE — ONE DATA ENTRY, FIVE INSTANT ANSWERS! [PROB-01]		Method: Ordering Data Least-to-Greatest for Median (Middle), Mode (Most Frequ..	
#1: Load 4, 9, 2, 7, 8 into [Σ+]. Find the Median ([f] [MED]) and Range ([RNG]). SC-6 Keys: Load 5 nums -> [f] [MED], [RNG] Ans: Median = 7, Range = 7 (9 - 2)	#2: Load 12, 15, 12, 18, 20, 13 into [Σ+]. Find the Median, Mode ([g] [MODE]), and Range. SC-6 Keys: Load 6 nums -> [f] [MED], [g] [MODE], [RNG] Ans: Median = 14, Mode = 12, Range = 8		
#3: Find the Mean, Median, Mode, and Range of: 5, 8, 8, 10, 14. SC-6 Keys: Load 5 nums into [Σ+] Ans: Mean = 9, Med = 8, Mode = 8	#4: Find the Minimum ([f] [MIN]), Maximum ([g] [MAX]), and Range ([RNG]) of: 23, 45, 19, 38, 51. SC-6 Keys: Load 5 nums -> [f] [MIN], [g] [MAX], [RNG] Ans: Min = 19, Max = 51, Range = 32		
#5: Even Count Median: Find the Median of the 6 test scores 70, 80, 84, 90, 92, 98. SC-6 Keys: Load 6 nums -> [f] [MED] Ans: 87 ((84+90)÷2)	#6: Outlier Check: Earnings are \$15, \$18, \$15, \$20, \$17, \$90. Find Mean and Median. Which represents a typical? SC-6 Keys: Load 6 nums -> [g] [x-bar], [f] [MED] Ans: Mean=\$29.17, Med=\$17.50 (Median)		
#7: What happens to the Mean and Median of {10, 12, 14, 16, 18} if 18 changes to 100? SC-6 Keys: Test both on [Σ+]! Ans: Mean jumps 14 -> 30.8; Med = 16	#8: Mystery Range: The minimum score on a quiz is 64 and the Range is 31. What was the maximum score? SC-6 Keys: 64 [ENTER] 31 [+] Ans: 95		
#9*: Find Median and Range of {14, 8, 21, 11, 16} both by sorting tiles by hand AND with [f] [MED] & [RNG]! SC-6 Keys: Sorted: 8, 11, 14, 16, 21 Ans: Median = 14, Range = 13 (21 - 8)	#10*: Home prices on a block (in \$1,000s): 210, 220, 215, 225, 980. Find Mean and Median—which should a buyer use? SC-6 Keys: Load 5 nums -> [g] [x-bar], [f] [MED] Ans: Mean=\$370k, Med=\$220k (True Mean)		

SEC 9.3: QUARTILES, INTERQUARTILE RANGE ([IQR]) & BOX-AND-WHISKER PLOTS [FRAC-01]		Method: 5-Number Summary (Min, Q1, Med, Q3, Max), Interquartile Range (IQR = Q3 - Q1)	
#1: Load 10, 20, 30, 40, 50 into [Σ+]. Record Min, Q1, Med, Q3, Max, and [IQR]. SC-6 Keys: Load 5 nums -> [f] [1Q], [g] [3Q], [IQR] Ans: Min=10, Q1=15, Med=30, Q3=40, IQR=25	#2: Load 4, 6, 8, 10, 12, 14, 16 into [Σ+]. Find Q1, Median, Q3, and [IQR]. SC-6 Keys: Load 7 nums -> [f] [1Q], [g] [3Q], [IQR] Ans: Q1=6, Med=10, Q3=14, IQR=8		
#3: If a box plot has Q1 = 24 and Q3 = 58, what is the Interquartile Range (IQR)? SC-6 Keys: 58 [ENTER] 24 [-] Ans: 34	#4: What percent of data in a Box Plot falls above Q1 (the 25th percentile)? SC-6 Keys: 3 quarters = 3 × 25% Ans: 75%		
#5: Find the 5-Number Summary and [IQR] of the 9 scores: 68, 72, 75, 78, 82, 85, 88, 92, 96. SC-6 Keys: Load 9 nums into [Σ+] Ans: 68, 73.5, 82, 90, 96; IQR = 17	#6: Find Q1, Median, Q3, and [IQR] for the 8 speeds: 42, 45, 48, 50, 52, 55, 58, 60. SC-6 Keys: Load 8 nums into [Σ+] Ans: Q1=46.5, Med=51, Q3=56.5, IQR=10		
#7: Consistency Check: Player A has IQR = 4 pts and Player B has IQR = 19 pts. Who is more consistent? SC-6 Keys: Compare box widths Ans: Player A (smaller IQR = tighter spread)	#8: Outlier Rule (1.5 × IQR): If Q1 = 40, Q3 = 60 (IQR = 20), any score above Q3 + 1.5(IQR) is an outlier. Find t. SC-6 Keys: 60 [ENTER] 1.5 [ENTER] 20 [×] [+] Ans: 90 (Any score > 90 is an outlier)		
#9*: For {12, 15, 18, 22, 25, 28, 34}, find [IQR] both with the [IQR] key AND by subtracting [g] [3Q] - [f] [1Q]! SC-6 Keys: Load 7 nums -> [IQR] Ans: IQR = 13 (28 - 15 = 13)	#10*: 200 students take a test. The box plot has Min=50, Q1=70, Med=80, Q3=90, Max=100. How many students.. SC-6 Keys: 200 [ENTER] 50 [f] [%] Ans: 100 students (50% of 200)		

SEC 9.4: MEAN ABSOLUTE DEVIATION ([g] [MAD]) WITHOUT THE 20-MINUTE NIGHTMARE [COUNT-01]		Method: Mean Absolute Deviation (MAD) — Average Distance of Data Values from..	
#1: Load 2, 4, 6 into [Σ+]. Find the Mean ([g] [x-bar]) and MAD ([g] [MAD]). SC-6 Keys: 2 [Σ+] 4 [Σ+] 6 [Σ+] [g][MAD] Ans: Mean = 4, MAD = 1.33 (4/3)	#2: Load 10, 12, 14, 16, 18 into [Σ+]. Find the Mean and MAD. SC-6 Keys: Load 5 nums -> [g] [x-bar], [g] [MAD] Ans: Mean = 14, MAD = 2.4		
#3: Load 5, 8, 8, 10, 14 into [Σ+]. Find the Mean and MAD. SC-6 Keys: Load 5 nums -> [g] [x-bar], [g] [MAD] Ans: Mean = 9, MAD = 2.4	#4: What is the MAD of 7, 7, 7, 7, 7 (5 identical towers)? SC-6 Keys: All distances from 7 are 0! Ans: Mean = 7, MAD = 0		
#5: Find the Mean and MAD of: 20, 24, 28, 32, 36. SC-6 Keys: Load 5 nums -> [g] [x-bar], [g] [MAD] Ans: Mean = 28, MAD = 4.8	#6: Find the Mean and MAD of the 6 sprint times: 12.4, 13.0, 12.6, 13.2, 12.8, 14.0. SC-6 Keys: Load 6 decimals -> [g] [x-bar], [g] [MAD] Ans: Mean = 13.0, MAD = 0.40		
#7: Find the Mean and MAD of quiz scores: 82, 85, 88, 90, 95. SC-6 Keys: Load 5 nums -> [g] [x-bar], [g] [MAD] Ans: Mean = 88, MAD = 3.6	#8: Team A has Mean = 50, MAD = 2.1. Team B has Mean = 50, MAD = 8.4. Which team's scores are more spread out? SC-6 Keys: Compare MADs Ans: Team B (larger MAD = more spread)		
#9*: For {6, 10, 11, 13}, find MAD both by averaging [x - 10] distances AND with 1 click of [g] [MAD]! SC-6 Keys: Mean=10; dists 4+0+1+3=8 ÷ 4 Ans: Mean = 10, MAD = 2.0	#10*: Full Chapter 9 Boss Sweep: For {5, 8, 8, 10, 14}, record [g] [x-bar], [f] [MED], [g] [MODE], [RNG], [IQR], and [MAD]. SC-6 Keys: 1 entry -> 6 stats! Ans: x-bar=9, Med=8, Mode=8, Range=9, MAD=3.5		



Unit 10: Grade 7 Bridge — Signed Rationals, 2-Step Equations & Probability — Complete..

Big Ideas Math Grade 7 Bridge — Chapters 1–3 & Chapter 7 • Manipulative Kits: Ten-Frame Zero-Pair Counters (BASE-10) + Algebra Stage (ALGB-01) + Probability Studio (PROB-01)

Target Misconception: Students guess signs when adding/subtracting negatives, get -25 instead of +25 for $(-5)^2$ on algebraic calculators, undo $\times 3$ before $+7$ in $3x + 7 = 28$, and confuse Permutations (order matters) with Combinations (order doesn't).**Hands-On Block Remediation:** Use Yellow/Red counters to show removing 4 red debt tokens ($10 - (-4)$) equals $+14$. Notice how RPN 5 $[+/-] [x^2]$ squares the entire register $(-5)^2 = +25$ without parentheses! Unwrap 2-step equations in reverse (untie ribbon $\pm$ first, open box $\times a$ second), and finish with [DICE], [f] [nCr], [g] [nPr], and [f] [?].**Optional QUEST-01 Scoreboard:** 1 '+10' block = Solved 1 Way; stack a 2nd '+10' block (+20) = Solved 2 Ways (Blocks + Textbook/SC-6)!

SEC 10.1: ADDING & SUBTRACTING SIGNED NUMBERS – WHY 'MINUS A NEGATIVE' ADDS! [BASE-10]		Method: Zero-Pair Counter Cancellation & Add-the-Opposite Rule for Subtraction	
#1:	Solve side-by-side: (a) $-15 + 9$ and (b) $-15 + (-9)$. SC-6 Keys: 15 [+/-] [ENTER] 9 [+] / 9 [+/-] [+] Ans: (a) -6; (b) -24	#2:	Solve: $14 + (-23)$. SC-6 Keys: 14 [ENTER] 23 [+/-] [+] Ans: -9
#3:	Taking Away a Penalty: Solve (a) $12 - (-8)$ and (b) $-12 - (-8)$. SC-6 Keys: 12 [ENTER] 8 [+/-] [-] / 12 [+/-]... Ans: (a) 20; (b) -4	#4:	Solve: $-9 - 16$. (Start at -9 and go 16 steps further negative!) SC-6 Keys: 9 [+/-] [ENTER] 16 [-] Ans: -25
#5:	Solve with decimals: $-4.8 + (-3.5)$. SC-6 Keys: 4.8 [+/-] [ENTER] 3.5 [+/-] [+] Ans: -8.3	#6:	Solve with decimals: $6.4 - 11.2$. SC-6 Keys: 6.4 [ENTER] 11.2 [-] Ans: -4.8
#7:	Solve with decimals: $-7.5 - (-10.2)$. SC-6 Keys: 7.5 [+/-] [ENTER] 10.2 [+/-] [-] Ans: +2.7	#8:	Solve with signed fractions: $-3/4 - (-5/8)$. SC-6 Keys: [.] 3 [.] 4 [+/-] [ENTER] [.] 5 [.] 8.. Ans: -1/8
#9*:	Temperature in Fairbanks is -18°F at dawn and rises to $+7^{\circ}\text{F}$ by noon. Find the change ($7 - (-18)$) 2 ways! SC-6 Keys: 7 [ENTER] 18 [+/-] [-] Ans: +25°F (Way 2: 18 steps to..)	#10*:	Evaluate $-2\frac{1}{2} + 4\frac{1}{4} - (-1\frac{1}{8})$ on the SC-6 and check by converting to eighths! SC-6 Keys: 2.5 [+/-] [ENTER] 4.25 [+] 1.125 [+] Ans: 2 7/8 (2.875)

SEC 10.2: MULTIPLYING & DIVIDING SIGNED RATIONALS – THE LIGHT-SWITCH FLIP RULE [BASE-10]		Method: Sign Rules for Multiplying & Dividing Rational Numbers (Same Signs = ..)	
#1: Compute: (a) $7 \times (-8)$ and (b) $(-7) \times (-8)$. SC-6 Keys: 7 [ENTER] 8 [+/-] [x] / 7 [+/-]... Ans: (a) -56; (b) +56	#2: Compute: (a) $-45 \div 9$ and (b) $-45 \div (-9)$. SC-6 Keys: 45 [+/-] [ENTER] 9 [÷] / 9 [+/-] [÷] Ans: (a) -5; (b) +5		
#3: Compute $(-5)^2$ using 5 [+/-] [x ²]. Why is it +25? SC-6 Keys: 5 [+/-] [x ²] Ans: +25 (2 negatives = +)	#4: Compute $(-2)^3$ using 2 [+/-] [g] [x ³]. Why is a negative cubed still negative? SC-6 Keys: 2 [+/-] [g] [x ³] Ans: -8 (3 negatives = odd = -)		
#5: Multiply signed decimals: $(-3.5) \times (-2.4)$. SC-6 Keys: 3.5 [+/-] [ENTER] 2.4 [+/-] [x] Ans: +8.4	#6: Divide signed decimals: $-14.4 \div 1.2$. SC-6 Keys: 14.4 [+/-] [ENTER] 1.2 [÷] Ans: -12		
#7: Multiply signed fractions: $(-2/3) \times (9/10)$. SC-6 Keys: [.] 2 [.] 3 [+/-] [ENTER] [.] 9 [.] 1.. Ans: -3/5 (-0.6)	#8: Divide signed fractions: $-5/6 \div (-5/12)$. SC-6 Keys: [.] 5 [.] 6 [+/-] [ENTER] [.] 5 [.] 1.. Ans: +2		
#9*: Triple Product: Evaluate $(-4) \times (-5) \times (-3)$ both by counting negative signs AND on your SC-6! SC-6 Keys: 4 [+/-] [ENTER] 5 [+/-] [x] 3 [+/-] [x] Ans: -60 (3 negatives = odd = -)	#10*: A submarine dives 360 ft in 8 minutes (-45 ft/min). Confirm the total change in 8 min and the change per mi.. SC-6 Keys: 360 [+/-] [ENTER] 8 [÷] Ans: -45 ft/min (Check: -45×8..)		

SEC 10.3: SOLVING TWO-STEP EQUATIONS (AX + B = C) – UNWRAPPING IN REVERSE! [ALGB-01]		Method: Solving Two-Step Equations (ax + b = c) by Undoing Addition/Subtracti...	
#1: Solve $4x + 9 = 45$. Write the Step 1 value ($4x = ?$) and final x . SC-6 Keys: 45 [ENTER] 9 [-] 4 [+] Ans: $4x = 36 \rightarrow x = 9$	#2: Solve $5x - 12 = 38$. (Undo -12 with [+], first, then +5!) SC-6 Keys: 38 [ENTER] 12 [+] 5 [÷] Ans: $5x = 50 \rightarrow x = 10$		
#3: Solve $6y + 11 = 59$. SC-6 Keys: 59 [ENTER] 11 [-] 6 [+] Ans: $6y = 48 \rightarrow y = 8$	#4: Solve $8n - 15 = 49$. SC-6 Keys: 49 [ENTER] 15 [+] 8 [÷] Ans: $8n = 64 \rightarrow n = 8$		
#5: Solve $m / 4 + 6 = 15$. (Subtract 6 first, then multiply by 4!) SC-6 Keys: 15 [ENTER] 6 [-] 4 [×] Ans: $m/4 = 9 \rightarrow m = 36$	#6: Solve $k / 3 - 5 = 7$. SC-6 Keys: 7 [ENTER] 5 [+] 3 [×] Ans: $k/3 = 12 \rightarrow k = 36$		
#7: Solve $-3x + 14 = 2$. SC-6 Keys: 2 [ENTER] 14 [-] 3 [+/-] [+] Ans: $-3x = -12 \rightarrow x = 4$	#8: Solve $2.5w + 8 = 23$. SC-6 Keys: 23 [ENTER] 8 [-] 2.5 [÷] Ans: $2.5w = 15 \rightarrow w = 6$		
#9*: A repair tech charges \$35 flat plus \$25/hr ($25h + 35 = 160$). Find hours h by unwrapping AND plug-in check! SC-6 Keys: 160 [ENTER] 35 [-] 25 [÷] Ans: $h = 5$ hours (Check: $25(5) + ..$)	#10*: You save \$15/week toward a \$120 skateboard and already have \$45 ($15w + 45 = 120$). How many weeks w ? SC-6 Keys: 120 [ENTER] 45 [-] 15 [÷] Ans: $w = 5$ weeks (Check: $15(5) + ..$)		

SEC 10.4: PROBABILITY, COMBINATORICS & GRADUATION QUIZ SPRINT ([DICE], [X!], [F] [nCr],...		Method: Theoretical Probability $P(E)$ = Favorable / Total, Complement $P(\text{not } E) = 1 - P(E)$	
#1: Roll a fair 6-sided die. Find P(rolling a 5) as a fraction, and P(rolling an even number) in simplest form. SC-6 Keys: 1/6; and 3/6 -> [g] [SIMP] Ans: 1/6; and 1/2 (50%)	#2: A 10-sector spinner has 4 Blue, 3 Gold, 3 Red. Find P(Blue) as a simplified fraction, decimal, and percent. SC-6 Keys: [.] 4 [.] 10 [g] [SIMP] [FDISP] Ans: 2/5, 0.4, 40%		
#3: Using the same 10-sector spinner, find P(NOT Red) as a fraction and percent. SC-6 Keys: (10 - 3) / 10 = 7/10 Ans: 7/10 (70%)	#4: In how many ways can 4 students line up at the door? Compute 4! using [g] [x!]. SC-6 Keys: 4 [g] [x!] Ans: 24 ways		
#5: In how many ways can you arrange 6 books on a shelf? Compute 6! using [g] [x!]. SC-6 Keys: 6 [g] [x!] Ans: 720 ways	#6: How many ways can you choose a 3-person team from 8 players (order does NOT matter: [f] [nCr])? SC-6 Keys: 8 [ENTER] 3 [f] [nCr] Ans: 56 teams		
#7: How many ways can 1st, 2nd, and 3rd place be awarded among 8 finalists (order DOES matter: [g] [nPr])? SC-6 Keys: 8 [ENTER] 3 [g] [nPr] Ans: 336 podiums	#8: Two Independent Events: You flip a coin (1/2) AND roll a 6-sided die ($P(>4) = 2/6 = 1/3$). Multiply to find P(H.. SC-6 Keys: [.] 1 [.] 2 [ENTER] [.] 1 [.] 3 [x] Ans: 1/6		
#9*: From 10 toppings, compare choosing 3 toppings ([f] [nCr]) vs. 3 ordered medals ([g] [nPr]). How are they rel.. SC-6 Keys: 10 [ENTER] 3 [f] [nCr] / [g] [nPr] Ans: 120 vs 720 (120 x 3! = 720)	#10*: GRADUATION BOSS: Compute 5! both with [g] [x!] AND 5 [ENTER] 5 [g] [nPr], then complete a 5-streak on.. SC-6 Keys: 5 [g] [x!]; then [f] [?] Ans: 120 ways (Course Complete!)		