

Real Numbers & The Pythagorean Theorem: Radicals & Square Roots

Tactile Concrete-Pictorial-Abstract (CPA) Station Guide • CCSS.MATH.8.G.B.7

Student Name: _____

Date: _____

Model: SC-32

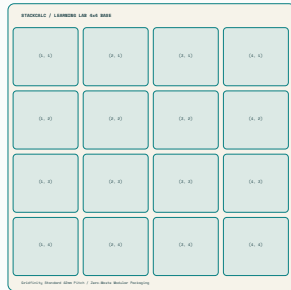
Check Score: ___ / 4

STUDENT SELF-CHECK RULE (NO CHEATING):

Build with blocks and solve on paper first! Use your SC-32 calculator ONLY to verify answers on the 4-line LCD screen.

STATION LAB TUTORIAL: BENCH SCHEMATIC & CPA PROGRESSION

1. 2D Bench Blueprint



Kit: Gridfinity Baseplate

2. Desk Setup (Concrete -> Pictorial)

Physical Bench Setup:

Form right triangle with legs 3 and 4 along grid studs; hypotenuse span is 5 units.

Sketch Model on Paper:

Draw squares on each side: 3^2 (9) + 4^2 (16) = 5^2 (25).

3. Step-by-Step LCD Stack Trace (SC-32)

MODE: 123 Base-10 Arithmetic

1. 6 X: 6 Leg a = 6 into X

2. x^2 X: 36 Square a: $6^2 = 36$

3. 8 Y: 36 | X: 8 Leg b = 8 into X

4. x^2 Y: 36 | X: 64 Square b: $8^2 = 64$

EXPECTED LCD X: c = 10

1 Find hypotenuse c for legs a = 8, b = 15.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-32

2 Find hypotenuse c for legs a = 7, b = 24.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-32

3 Find leg a if hypotenuse c = 20 and leg b = 16: $\sqrt{20^2 - 16^2}$.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-32

4 Approximate $\sqrt{75}$ to two decimal places.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-32

Station Diagnostic & Solution Key: Chapter 7

Real Numbers & The Pythagorean Theorem: Radicals & Square Roots • Manipulative Setup, Diagnostic Rubric & Verification Flow

MANIPULATIVE HARDWARE STATION INVENTORY & 3D PRINT PREPARATION

Station Kit: Gridfinity 4x4 Coordinate Baseplate & Triangles

CAD Blueprint: gridfinity_baseplate

Target Device: SC-32 Scientific

STL Source File:

Education/scad/lib/gridfinity.scad

Standard: Gridfinity 42mm Pitch / 0.6mm Inset Markings

Recommended Filaments:

Charcoal 4x4 Baseplate & Teal Cubes (PLA)

#	Math Problem Prompt	Expected Math Answer	Self-Check Keystrokes & RPN Stack
1	Find hypotenuse c for legs a = 8, b = 15. Standard: CCSS.MATH.8.G.B.7	c = 17	[8] [x²] [1] [5] [x²] [+] [√]
2	Find hypotenuse c for legs a = 7, b = 24. Standard: CCSS.MATH.8.G.B.7	c = 25	[7] [x²] [2] [4] [x²] [+] [√]
3	Find leg a if hypotenuse c = 20 and leg b = Standard: CCSS.MATH.8.G.B.7	a = 12	[2] [0] [x²] [1] [6] [x²] [-] [√]
4	Approximate √75 to two decimal places. Standard: CCSS.MATH.8.G.B.7	8.66	[7] [5] [√]

TEACHER DIAGNOSTIC GUIDE: COMMON MISCONCEPTIONS & REMEDIATION

Key Misconception to Target During Station Observation:

Watch for forgetting to take the square root at the end of $a^2 + b^2$.

How the Manipulatives & Calculator Foster Self-Correction:

Students solve with pencil and physical blocks first. When they self-check on the SC-32, any discrepancy between their written answer and the calculator's 4-line LCD immediately prompts them to re-inspect their physical bench model or regrouping, turning errors into productive struggle without teacher intervention.

Station Facilitation & Pacing Tip:

Keep 3D printed trays docked on standard Gridfinity baseplates to prevent loose parts on student desks. Encourage students to articulate their CPA steps: name the block representation (Concrete), point to their drawn tape/bond model (Pictorial), and verify register values (Abstract).

CLASSROOM SCORING & STATION MASTERY RUBRIC

Exemplary (18–20 pts):	Complete, accurate manipulative sketches; exact math answers; independently verified self-check on LCD stack.
Proficient (14–17 pts):	Correct math answers; minor sketch omissions; verified on calculator with minimal teacher prompting.
Developing (10–13 pts):	Understands problem concept but made computational slips; successfully self-corrected using calculator LCD.
Intervention (<10 pts):	Relied on calculator before solving on paper, or struggled with underlying physical manipulative models.