Unit 8: Surface Area & Volume of 3D Solids — Penguin Huddles, Camping Tents, Aquariums & Ziplines

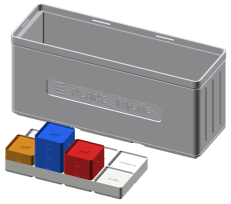
Surface Area of Rectangular & Triangular Prisms, Pyramids, Volume of Prisms, and Circles/Cones/Hypotenuse

Why doesn't an Emperor penguin chick freeze when Antarctic winds hit -40°C? When Zoe read that penguins survive by huddling together to shrink their exposed 'surface area' while keeping their warm 'volume' the same, she admitted she always mixed those two terms up in math class. Liam had the same headache in the workshop: when he sewed nylon for a camping tent or ordered glass for an open-top fish tank, he wasn't sure when to add flat walls and when to multiply length times width times height.

Marcus ran into a surprise of his own at the team pizza night. The pizzeria offered either one 16-inch pizza or two 10-inch pizzas for the same price, and almost everyone at the table assumed two 10-inch pizzas had more food simply because 10 + 10 is 20.

Out on the adventure course, they also needed to find the exact length of a diagonal zipline cable stretched from the top of a 15-meter tower to an anchor 20 meters away on the ground without climbing into the air with a tape measure.

By unfolding cardboard boxes and tents flat onto the table as 2D nets, packing wooden cubes into rectangular trays, and checking prism volumes, circle areas, and right-triangle diagonals on the SC-6, Zoe, Liam, and Marcus master every 3D measurement.



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

UNIT 8 LESSONS — LEARN TWO TEXTBOOK WAYS FIRST, THEN CHECK YOUR WORK ON THE SC-6 CALCULATOR

SEC 8.1 (pp.77-78) Three-Dimensional Figures, Nets & Rectangular Prisms

Textbook Ways: Way 1: Unfold into a 6-Face 2D Net | Way 2: Opposite Face Pairs SA = 2(lw + lh + wh) | Way 3: Lateral Strip Ph + 2B

Learn by Hand: The surface area of a polyhedron is the sum of the areas of all its flat faces, which can be visualized by unfolding the solid into a two-dimensional net. A rectangular prism of length l, width w, and height h has 6 rectangular faces arranged in 3 congruent opposite pairs: SA = 2lw + 2lh + 2wh.

Check Your Work on the SC-6 Calculator:

[g] [CLΣ] 8 [ENTER] 5 [f] [■] 2 [×] [Σ+] 8 [ENTER] 3 [f] [■] 2 [×] [Σ+] 5 [ENTER] 3 [f] [■] 2 [×] [Σ+] [f] [Σx]

Unfold the 6-face net and find the area of each pair on paper first. On your SC-6, clear stats with [g][CLΣ], add each face pair using [f][RECT] 2 [×] [Σ+], and press [f][Σx] to confirm 158 cm^2!

SEC 8.2 (pp.79-80) Surface Areas of Triangular Prisms and Pyramids

Textbook Ways: Way 1: Add All Individual Faces on the 2D Net | Way 2: Base Area + Combined Lateral Area

Learn by Hand: To find the surface area of a triangular prism, unfold its net into 2 congruent triangular bases and 3 rectangular lateral faces, and sum their areas. To find the surface area of a pyramid, add the area of its single polygon base to the areas of its triangular lateral faces (using the slant height of each triangle).

Check Your Work on the SC-6 Calculator:

[g] [CLΣ] 1 0 [x^2] [Σ+] 1 0 [ENTER] 1 2 [g] [▲] 4 [×] [Σ+] [f] [Σx]

Press [g][CLΣ] 10 [x^2] [Σ+] 10 [ENTER] 12 [g][TRI] 4 [×] [Σ+] [f][Σx] to confirm 340 m^2!

SEC 8.3 (pp.81-82) Volumes of Rectangular Prisms

Textbook Ways: Way 1: Base Area × Height (V = Bh) | Way 2: Multiply Length × Width × Height (Fractions or Decimals)

Learn by Hand: While Surface Area measures the 2D flat area covering the outside of a solid (in square units), Volume measures the 3D space inside the solid—the number of unit cubes needed to fill it completely (in cubic units). For any rectangular prism, Volume equals the base area B times the height h: V = Bh = l × w × h.

Check Your Work on the SC-6 Calculator:

1 2 [ENTER] 8 [f] [■] 5 [f] [▣]

Type 12 [ENTER] 8 [f][RECT] 5 [f][PRISM] (Base Area 96 × Height 5) to confirm 480 in^3!

SEC 8.4 (pp.83-84) Circles, Cones, and the Pythagorean Theorem

Textbook Ways: Way 1: Exact Form in Terms of π & $a^2 + b^2 = c^2$ | Way 2: Decimal Approximation (π ≈ 3.14) & Scaled Triples

Learn by Hand: In this Grade 7/8 Geometry Bridge: (1) The area of a circle with radius r is $A = \pi r^2$ (where r is half the diameter d). (2) In a right triangle with legs a and b and hypotenuse c, the Pythagorean Theorem states $a^2 + b^2 = c^2$, so $c = \sqrt{(a^2 + b^2)}$. (3) The volume of a cone is one-third the volume of a cylinder with the same base and height: $V = 1/3\pi r^2 h$.

Check Your Work on the SC-6 Calculator:

6 [f] [●] 1 2 [ENTER] 5 [g] [◣]

Press 6 [f][CIRC] to verify 113.10 in^2, and 12 [ENTER] 5 [g][HYP] to verify 13 ft!

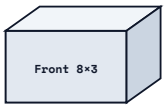
HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 8.1 — Practice A: Three-Dimensional Figures, Nets & Rectangular Prisms

Key Vocabulary: polyhedron ● face ● edge ● vertex ● rectangular prism ● cube ● net ● surface area (SA) Name: _____ Date: _____ Score: ____ / 100

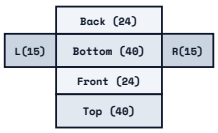
TEXTBOOK CONCEPT & HANDS-ON MODEL (PLACE VALUE BLOCKS)

3D Prism (8×5×3 cm)



SA = 2(40+24+15) = 158

Way 1: Unfolded 6-Face 2D Net



HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Method 1 (2D Net): Unfold the 3D rectangular prism into 6 flat rectangles (Top, Bottom, Front, Back, Left, Right) and add all 6 areas.

Textbook Method 2 (Opposite Face Pairs Formula): Since opposite faces are congruent, use SA = 2lw + 2lh + 2wh = 2(lw + lh + wh).

WATCH OUT: A rectangular prism has 6 faces (3 matching pairs: 2lw + 2lh + 2wh) — don't forget to double all three face pairs!

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

Problem: Find the surface area of a rectangular prism measuring 8 cm long, 5 cm wide, and 3 cm high.

WAY 1: Add All 6 Faces on a 2D Net
Top (40) + Bottom (40) + Front (24) + Back (24) + Left (15) + Right (15) = 80 + 48 + 30 = 158 cm².

WAY 2: Opposite Face Pairs Formula SA = 2(lw + lh + wh)
Sum the 3 distinct face areas and multiply by 2: SA = 2(8·5 + 8·3 + 5·3) = 2(40 + 24 + 15) = 2(79) = 158 cm².

WAY 3: Lateral Perimeter Strip + 2 Bases (Ph + 2B)
4 side walls form a strip of width P = 2(8+5) = 26 cm and height 3 cm (26×3 = 78 cm²), plus 2 bases (80 cm²) = 158 cm².

Answer: 158 cm² 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.1 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

[g] [CLΣ] 8 [ENTER] 5 [f] [■] 2 [×] [Σ+] 8 [ENTER] 3 [f] [■] 2 [×] [Σ+] 5 [ENTER] 3 [f] [■] 2 [×] [Σ+] [f] [Σx]

Unfold the 6-face net and find the area of each pair on paper first. On your SC-6, clear stats with [g][CLΣ], add each face pair using [f][RECT] 2 [×] [Σ+], and press [f][Σx] to confirm 158 cm²!

SECTION 8.1 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

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

1 **Find the surface area of a cube with edge length s = 4 cm.**
Starter Step 1: A cube has 6 identical square faces—square the edge length (4^2) to find 1 face, then multiply by 6.

Way 1 (Paper Work):

1 Square Face = s² = _____

Cube SA = 6 × s² = _____

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

2 **Find the surface area of a cube with edge length s = 9 in.**
Starter Step 1: A cube has 6 identical square faces—square the edge length (9^2) to find 1 face, then multiply by 6.

Way 1 (Paper Work):

1 Square Face = s² = _____

Cube SA = 6 × s² = _____

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

3 **Find the surface area of a rectangular prism measuring 6 cm long, 4 cm wide, and 3 cm high.**

Way 1 (Paper Work):

Faces: l·w=___ l·h=___ w·h=___

SA = 2(___ + ___ + ___) = _____

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

4 **Find the surface area of a rectangular box measuring 10 in. long, 5 in. wide, and 2 in. high.**

Way 1 (Paper Work):

Faces: l·w=___ l·h=___ w·h=___

SA = 2(___ + ___ + ___) = _____

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

5 **Find the surface area of a rectangular prism with length l = 12 ft, width w = 8 ft, and height h = 5 ft.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Find the surface area of a rectangular prism measuring 5 m long, 4 m wide, and 2.5 m high.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **A cube has a total surface area of 150 cm². What is the area of one square face, and what is the edge length s of the cube?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Error Analysis: For a 5 cm by 4 cm by 3 cm box, Leo added 20 + 15 + 12 = 47 cm². What did he forget to do, and what is the correct surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Open-Top Cold-Storage Battery Cargo Pod: An open-top rectangular battery cargo pod (5 faces, no top lid) is 30 cm long, 20 cm wide, and 15 cm tall. How many square centimeters of insulation paneling are needed to line the bottom and four sides?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Gift Box Wrapping Paper: You are wrapping a gift box that is 15 inches long, 10 inches wide, and 4 inches tall. If you have a sheet of wrapping paper with an area of 550 in.², do you have enough paper to cover the box?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 8.1 — Practice B: Modeling Real Life (Three-Dimensional Figures, Nets & Rectangular Prisms)

Textbook Ways: Unfold into a 6-Face 2D Net | Opposite Face Pairs SA = 2(lw + lh + wh) | Lateral Strip Ph + 2B Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — CUBE & OPEN-TOP STORAGE BIN (2 TEXTBOOK WAYS = +20 PTS DOUBLE)

Problem: Find the surface area of a cube with edge length 7 inches, and find the outer surface area of an open-top bin measuring 10 cm by 8 cm by 5 cm.

WAY 1: Add the Exposed Faces on the 2D Net

Cube (6 identical 7×7 squares): 6 × 49 = 294 in^2. Open-Top Bin (5 faces): 1 bottom (10×8 = 80) + 2 fronts (2×50 = 100) + 2 sides (2×40 = 80) = 260 cm^2.

WAY 2: Full 6-Face Formula Minus the Open Top

Full 10×8×5 prism SA = 2(80 + 50 + 40) = 340 cm^2. Subtract the missing 10×8 top lid (80 cm^2): 340 - 80 = 260 cm^2.

Watch-Out: Always check if a real-world box has an open top (5 faces) or all 6 faces!

WATCH OUT: A rectangular prism has 6 faces (3 matching pairs: 2lw + 2lh + 2wh) — don't forget to double all three face pairs!

Answer: Cube = 294 in^2; Open-Top Bin = 260 cm^2

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.1 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

7 x^2 6 ×

Calculate 6s^2 for the cube and the 5 panels of the open-top bin on paper first. Check on your SC-6: Press 7 [x^2] 6 [×] to confirm 294 in^2 for the cube.

Liam used to plug numbers blindly into the 6-wall box formula SA = 2(lw + lh + wh) without thinking about the actual object—until he ordered too much glass for an open-top aquarium and got the wrong painted area when Zoe glued two 4-centimeter wooden cubes face-to-face to model huddling penguins. When they sketched the 2D net of the fish tank flat on their blueprint, Liam saw why the formula failed him: an open-top tank only has 5 glass panels (no top lid!), and gluing two cubes together hides their 2 touching faces inside, leaving only 10 exposed outer squares instead of 12.

SECTION 8.1 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

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

1 **Cereal Box Cardboard: A cereal box is a rectangular prism measuring 20 cm long, 8 cm wide, and 30 cm tall. What is its total surface area?**

Starter Step 1: Find the area of the bottom (20×8), front (20×30), and side (8×30) rectangles, add them, and multiply by 2.

Way 1 (Paper Work):

Faces: l·w=___ l·h=___ w·h=___

SA = 2(___ + ___ + ___) = _____

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

2 **Foam Die Cube: A giant foam die is a cube with edge length 9 inches. What is the area of one face, and what is the total surface area of all 6 faces?**

Starter Step 1: Multiply 9 in. × 9 in. to find the area of 1 square face, then multiply by 6 faces for the total surface area.

Way 1 (Paper Work):

1 Square Face = s^2 = _____

Cube SA = 6 × s^2 = _____

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

3 **Open-Top Glass Aquarium: A rectangular glass fish tank is 24 inches long, 12 inches wide, and 15 inches tall, with an open top (no glass lid). What is the total area of the 5 glass panels?**

Way 1 (Paper Work):

Faces: l·w=___ l·h=___ w·h=___

SA = 2(___ + ___ + ___) = _____

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

4 **Wrapping Paper Check: You want to wrap a game console box measuring 15 in by 10 in by 4 in using a sheet of wrapping paper with area 600 in^2. Find the surface area of the box. Do you have enough paper?**

Way 1 (Paper Work):

Faces: l·w=___ l·h=___ w·h=___

SA = 2(___ + ___ + ___) = _____

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

5 **Painting a Bedroom: A bedroom is 12 feet long, 10 feet wide, and 8 feet high. You paint the 4 walls and the ceiling, but not the floor. How many square feet do you paint?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Cube Edge from Surface Area: A wooden cube has a total surface area of 150 square centimeters. What is the area of one face, and what is the edge length of the cube?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **Storage Trunk: A rectangular storage trunk measures 4 feet by 2 feet by 2 feet. What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Juice Box Carton: A juice box measures 6 cm by 4 cm by 10 cm. What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Doubling the Edge of a Cube: Cube A has an edge length of 3 cm and Cube B has an edge length of 6 cm. Find the surface area of each cube. How many times as great is Cube B's surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Two Cubes Glued Together: Two 4 cm by 4 cm by 4 cm cubes are glued together face-to-face to form an 8 cm by 4 cm by 4 cm rectangular prism. What is the surface area of the new prism?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

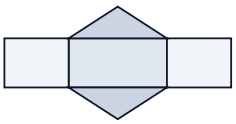
HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 8.2 — Practice A: Surface Areas of Triangular Prisms and Pyramids

Key Vocabulary: triangular prism • pyramid • lateral face • slant height • regular pyramid • 2D net Name: _____ Date: _____ Score: ____ / 100

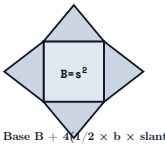
TEXTBOOK CONCEPT & HANDS-ON MODEL (PLACE VALUE BLOCKS)

Triangular Prism Net (5 Faces)



SA = 2 Tri Bases (1/2bh) + 3 Rect Sides

Square Pyramid Net (1 Base + 4 Triangles)



SA = Base B + 4(1/2 × b × slant l)

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Triangular Prisms: Unfold into 2 congruent triangular bases (each 1/2bh) plus 3 rectangular lateral faces, and add all 5 areas.

Textbook Pyramids: Unfold into 1 polygon base B plus triangular lateral faces using the slant height l (each 1/2bl): SA = B + 4(1/2bl).

WATCH OUT: Use the 1/2 on EVERY triangular face (A = 1/2bh or 1/2bl), and count all faces in the net (5 for triangular prism, 5 for square pyramid)!

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

Problem: Find the surface area of a square pyramid with a 10 m by 10 m square base and 4 congruent triangular faces each having base 10 m and slant height 12 m.

WAY 1: Add All 5 Faces on the Pyramid Net

Square base = 10 × 10 = 100 m^2. Each triangular face = 1/2 × 10 × 12 = 60 m^2. Total SA = 100 + 60 + 60 + 60 + 60 = 340 m^2.

WAY 2: Base Area + 4 × Lateral Triangle Formula

Since all 4 lateral triangles are congruent: SA = B + 4(1/2bl) = 10^2 + 4(1/2 · 10 · 12) = 100 + 240 = 340 m^2.

Answer: 340 m^2 1 Way = +10 | 2 Ways = +20!

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.2 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

[g] [CLΣ] 1 0 [x^2] [Σ+] 1 0 [ENTER] 1 2 [g] [▲] 4 [×] [Σ+] [f] [Σx]

Add the square base (10^2) and 4 triangles on paper first. Check on your SC-6:
Press [g][CLΣ] 10 [x^2] [Σ+] 10 [ENTER] 12 [g][TRI] 4 [×] [Σ+] [f][Σx] to confirm 340 m^2!

SECTION 8.2 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

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

1 **Find the surface area of a square pyramid with a 6 cm by 6 cm base and 4 triangular faces each having base 6 cm and slant height 5 cm.**

Starter Step 1: Unfold the pyramid into 1 square base (6 × 6) plus 4 identical triangles (each A = 1/2 × 6 × 5), then add them.

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

2 **Find the surface area of a square pyramid with an 8 in. by 8 in. base and 4 triangular faces each having base 8 in. and slant height 10 in.**

Starter Step 1: Unfold the pyramid into 1 square base (8 × 8) plus 4 identical triangles (each A = 1/2 × 8 × 10), then add them.

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

3 **Find the surface area of a square pyramid with a 12 ft by 12 ft base and 4 triangular faces each having base 12 ft and slant height 9 ft.**

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

4 **Four-Triangle Pyramid (Tetrahedron): A 4-sided pyramid is made of 4 identical equilateral triangles, each with a base of 6 cm and a height of 5.2 cm. What is the total surface area of all 4 faces?**

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

5 **A triangular prism has 2 right-triangle bases (b = 4 cm, h = 3 cm) and 3 rectangular faces of length 10 cm (widths 3 cm, 4 cm, and 5 cm). What is its surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **A triangular prism tent has 2 triangular ends (base 8 ft, height 3 ft) and 3 rectangular panels of length 7 ft (widths 5 ft, 5 ft, and 8 ft). What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **A regular tetrahedron has 4 congruent triangular faces each with base 8 cm and slant height 6.93 cm. What is its surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Compare the nets of a triangular prism and a square pyramid: how many triangular faces and how many rectangular/square faces does each solid have?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **A-Frame Camping Tent: An A-frame tent is a triangular prism with 2 triangular doors (base 6 ft, height 4 ft), a 6 ft by 8 ft floor, and 2 sloped roof panels (5 ft by 8 ft each). How many square feet of nylon fabric are in the tent?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Glass Pyramid Skylight: A rooftop skylight is shaped like a square pyramid with an open bottom (no floor)—only 4 congruent triangular glass panes, each with base 9 ft and slant height 6 ft. What is the total area of the glass panes?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

HANDS-ON MODEL: PLACE VALUE BLOCKS

Section 8.2 — Practice B: Modeling Real Life (Surface Areas of Triangular Prisms and Pyramids)

Textbook Ways: Add All Individual Faces on the 2D Net | Base Area + Combined Lateral Area Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — SKATEBOARD RAMP (TRIANGULAR PRISM) (2 TEXTBOOK WAYS = +20 PTS DOUBLE)

Problem: A skate ramp is a triangular prism with 2 right-triangle ends (base 6 ft, height 8 ft, ramp 10 ft) and a width of 10 ft. Find its total surface area.

WAY 1: Add All 5 Faces on the Unfolded 2D Net

2 Triangles = $2 \times (1/2 \cdot 6 \cdot 8) = 48$ ft^2. 3 Rectangles = $(6\times10) + (8\times10) + (10\times10) = 60 + 80 + 100 = 240$ ft^2. Sum: $48 + 240 = 288$ ft^2.

WAY 2: Combine the 3 Rectangles into One Lateral Strip

Perimeter of triangle base = $6 + 8 + 10 = 24$ ft. Lateral rectangle = $24 \times 10 = 240$ ft^2. Add 2 triangle bases (48 ft^2) → 288 ft^2.

Check: Two 24 ft^2 triangles + 60 + 80 + 100 = 288 ft^2.

WATCH OUT: Use the 1/2 on EVERY triangular face (A = 1/2bh or 1/2bl), and count all faces in the net (5 for triangular prism, 5 for square pyramid)!

Answer: 288 square feet

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.2 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

6 [ENTER] 8 [g][TRI] 2 [×] 6 [ENTER] 8 [+] 1 0 [+] 1 0 [f][RECT] [+]

Add the 2 triangular ends and 3 rectangular sides on paper first. Check on your SC-6:
Press 6 [ENTER] 8 [g][TRI] 2 [×] (48 ft^2) plus 6 [ENTER] 8 [+] 10 [+] 10 [f][RECT] (240 ft^2) [+] to confirm 288 ft^2.

When Liam tried to calculate the waterproof fabric needed for a triangular-prism camping tent and the shingles for a square-pyramid gazebo roof, he felt overwhelmed by all the 3D edges and slant heights. He was afraid he would count the wrong number of sides or forget to divide a triangle by 2. Then Marcus suggested mentally 'unzipping' the tent and flattening every wall onto the floor as a 2D net: 1 rectangular floor, 2 rectangular roof slopes, and 2 triangular end doors (5 faces total). Counting and labeling each flat piece in the net before doing any arithmetic kept him from missing a single wall.

SECTION 8.2 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

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

1 **Camping Tent: A tent shaped like a triangular prism has 2 triangular doors (each with base 6 ft and height 4 ft), two 5 ft by 8 ft roof panels, and a 6 ft by 8 ft rectangular floor. What is the total surface area of the tent?**

Starter Step 1: Find the area of the 2 triangular doors (each 1/2 × 6 × 4), the 2 rectangular roof panels (5 × 8), and the floor (6 × 8).

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

2 **Glass Pyramid Model: A scale model of a square pyramid has a 12 cm by 12 cm square base and 4 congruent triangular faces, each with a slant height of 10 cm. What is its total surface area?**

Starter Step 1: Find the area of the 12 cm by 12 cm square base plus the 4 congruent triangular faces (each A = 1/2 × 12 × 10).

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

3 **Gazebo Roof Shingles: A gazebo roof is a square pyramid with base edge 8 feet and slant height 6 feet. Find the lateral surface area (the 4 triangular roof faces, not including the open bottom).**

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

4 **Triangular Chocolate Box: A triangular prism box has 2 equilateral triangle ends (each with area 6.9 cm^2) and 3 identical rectangular sides (each 4 cm by 20 cm). What is the total surface area of the box?**

Way 1 (Paper Work):

Base Area(s) B = _____

+ Lateral Faces = _____ → SA=___

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

5 **Wooden Wedge: A right-triangular prism wedge has 2 triangular bases with legs 8 in and 6 in and hypotenuse 10 in. The prism is 5 inches wide. What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Four-Sided Game Die: A pyramid-shaped 4-sided die (called a tetrahedron) has 4 identical triangular faces, each with a base of 3 cm and a height of 2.6 cm. What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **Attic Roof & Gables: An attic prism has 2 triangular gables (each base 16 ft, height 6 ft) and 2 rectangular roof slopes (each 10 ft by 30 ft). What is the combined area of the 2 gables and 2 roof slopes?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Pyramid Paperweight: A square pyramid has a 6 in by 6 in base and a total surface area of 96 in^2. What is the area of one of its four triangular faces, and what is its slant height?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Triangular Prism Gift Box: A prism has 2 triangular bases (each with base 12 cm and height 8 cm) and 3 rectangular faces of widths 10 cm, 10 cm, and 12 cm, each 15 cm long. What is its total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Comparing Two Pyramids: Square Pyramid A has a 10 cm by 10 cm base and slant height 8 cm. Square Pyramid B has an 8 cm by 8 cm base and slant height 10 cm. Which pyramid has the greater total surface area?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

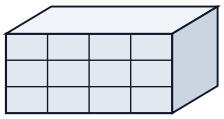
HANDS-ON MODEL: FRACTION STRIPS

Section 8.3 — Practice A: Volumes of Rectangular Prisms

Key Vocabulary: volume (V) • cubic units • base area (B = lw) • V = Bh = lwh • fractional edge length Name: _____ Date: _____ Score: ____ / 100

TEXTBOOK CONCEPT & HANDS-ON MODEL (FRACTION STRIPS)

Unit-Cube Layer Packing (V = Bh)



Base B = 12×8 = 96 | × 5 layers = 480 in³

3 Ways to Find Prism Volume:

Way 1 (Layers): V = Base Area B × h

Way 2 (Formula): V = l × w × h

Missing Height: h = V ÷ (l × w)

(Wait: 1/2-in cubes → 8 fit per 1 in³!)

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Concept: Volume measures the number of unit cubes that fill a 3D solid. Multiply Base Area B = lw by height h: V = Bh = lwh.

Textbook Fractional Edge Lengths: Pack unit-fraction cubes OR multiply fractional dimensions as improper fractions or decimals.

WATCH OUT: Volume is measured in CUBIC units (in.³, cm³). Eight 1/2-inch cubes (2 × 2 × 2 = 8) fit inside 1 cubic inch!

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

Problem: Find the volume of a crate measuring 12 in. by 8 in. by 5 in., and an aquarium measuring 3 1/2 ft by 1 1/2 ft by 2 ft.

WAY 1: Layer Stacking V = Bh (With Unit Cubes)

Crate: Base B = 12 × 8 = 96 in²; multiply by 5 layers → 480 in³. Tank (3 1/2 × 1 1/2 × 2): Base B = (7/2)(3/2) = 21/4; × 2 = 10 1/2 ft³.

WAY 2: Multiply Three Dimensions (Improper Fractions or Decimals)

Crate: 12 × (8 × 5) = 12 × 40 = 480 in³. Tank in decimals: 3.5 × 1.5 × 2 = 3.5 × 3 = 10.5 ft³ (10 1/2 ft³).

Answer: Crate = 480 in.³; Aquarium = 10 1/2 ft³

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.3 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

1 2 ENTER 8 f ■ 5 f

Multiply length × width × height on paper first. Then check on your SC-6 using the Prism Volume pipeline: Type 12 [ENTER] 8 [f][RECT] 5 [f][PRISM] (Base Area 96 × Height 5) to confirm 480 in³!

SECTION 8.3 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

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

1 **Cereal Storage Container: Find the volume of a rectangular plastic container that is 18 cm long, 6 cm wide, and 28 cm tall.**

Starter Step 1: Multiply length × width (18 × 6) to find the Base Area B, then multiply by the height (28 cm).

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

2 **Find the volume of a cube with edge length s = 5 inches.**

Starter Step 1: For a cube with edge s = 5 in., multiply length × width × height: V = 5 × 5 × 5.

Way 1 (Paper Work):

Cube Edge s = _____

Volume V = s³ = s×s×s = _____

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

3 **Camp Lap Pool: A rectangular camp swimming pool is 25 meters long, 10 meters wide, and filled with water 2 meters deep. How many cubic meters of water does it hold?**

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

4 **A rectangular prism has a base area of B = 32 m² and a height of h = 7 m. What is its volume?**

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

5 **Find the volume of a fish tank that is 3 1/2 feet long, 1 1/2 feet wide, and 2 feet tall.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Find the volume of a wooden block measuring 4 1/2 inches long, 3 inches wide, and 2 inches high.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **A rectangular storage box has a volume of 270 in.³, a length of 9 in., and a width of 5 in. What is its height h?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **How many 1/2-inch cubes are needed to completely fill a 1-inch cube (measuring 1 in. by 1 in. by 1 in.)?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Garden Planter Depth: A raised cedar planter has a base measuring 9 inches by 5 inches and holds 360 cubic inches of potting soil. What is the depth h of the soil?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Packing Half-Inch Cubes: A wooden box has a volume of 27 cubic inches. How many 1/2-inch unit cubes can be packed inside the box?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

HANDS-ON MODEL: FRACTION STRIPS

Section 8.3 — Practice B: Modeling Real Life (Volumes of Rectangular Prisms)

Textbook Ways: Base Area × Height (V = Bh) | Multiply Length × Width × Height (Fractions or Decimals) Name: _____ Date: _____ Score: ____ / 100

WORKED EXAMPLE — FINDING MISSING DEPTH FROM VOLUME (2 TEXTBOOK WAYS = +20 PTS DOUBLE)

Problem: A cedar planter box is 9 inches long and 5 inches wide, and holds 360 cubic inches of soil. How deep is the soil in the planter box?

WAY 1: Find Base Area B First, Then Divide V ÷ B

Base area B = 9 × 5 = 45 in^2. Substitute into V = Bh: 360 = 45h → h = 360 ÷ 45 = 8 inches deep.

WAY 2: Divide Volume by Length, Then by Width

Divide 360 ÷ 9 in = 40 in^2, then divide 40 ÷ 5 in = 8 inches deep.

Check: 9 in × 5 in × 8 in = 360 in^3.

WATCH OUT: Volume is measured in CUBIC units (in.^{3}, cm^3). Eight 1/2-inch cubes (2 × 2 × 2 = 8) fit inside 1 cubic inch!

Answer: 8 inches deep

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.3 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

`3` `6` `0` `ENTER` `4` `5` `÷`

Find the base area B = 9 × 5 = 45 in^2 and divide 360 ÷ 45 on paper first. Check on your SC-6:
Press 360 [ENTER] 45 [÷] to confirm a depth of 8 inches.

Zoe used to confuse Surface Area (square units, cm^2) with Volume (cubic units, cm^3) until she watched a crow drop pebbles into a rectangular water tube with an 8 cm by 5 cm base. Wrapping paper or glass goes on the flat outside walls (square centimeters), while water and pebbles fill up the 3D space inside (cubic centimeters). Even better, she saw that every rectangular prism fills up like stackable layers: one 1-centimeter-deep layer of water in the tube holds 8 × 5 = 40 cm^3, so when the pebbles push 120 cm^3 of water upward, dividing 120 ÷ 40 shows the water must rise exactly 3 centimeters!

SECTION 8.3 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

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

1 **Swimming Lap Pool: A rectangular pool is 25 meters long, 10 meters wide, and 2 meters deep. What is the volume of the pool?**

Starter Step 1: Multiply length × width × depth (25 m × 10 m × 2 m) to find the volume in cubic meters.

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

2 **Raised Garden Bed: A cedar garden bed is 8 feet long, 4 feet wide, and 1 1/2 feet deep. How many cubic feet of soil are needed to fill it?**

Starter Step 1: Write 1 1/2 as 1.5 (or 3/2), then multiply length × width × depth (8 × 4 × 1.5).

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

3 **3D Printer Build Volume: A 3D printer has a cubic build volume measuring 25 cm on each edge. What is its build volume in cubic centimeters?**

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

4 **Bento Lunchbox: A rectangular bento box measures 6 1/2 inches long, 4 inches wide, and 2 1/2 inches tall. What is its volume?**

Way 1 (Paper Work):

Base Area B = l × w = _____

Volume V = B × h = _____

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

5 **Half-Inch Cube Packing: How many 1/2-inch cubes fit inside a 1-cubic-inch space, and how many 1/2-inch cubes are needed to completely fill a 3 in by 2 in by 2 in box?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Crow Water-Displacement Tank (Aesop's Fable): A crow's rectangular water tube has an 8 cm by 5 cm base. Dropping pebbles into the water displaces 120 cm^3 of volume. By how many centimeters does the water level rise?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **Cargo Container: A rectangular cargo box is 5.5 feet long, 4 feet wide, and 3.5 feet tall. What is its volume?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Concrete Patio Slab: A rectangular patio is 12 feet long, 9 feet wide, and 1/3 foot (4 inches) thick. How many cubic feet of concrete are needed?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Acrylic Puzzle Box: A kea parrot's acrylic puzzle box has a rectangular base of 9 inches by 5 inches and a volume of 360 cubic inches. What is the height of the puzzle box?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Aquarium Gallons: A fish tank measures 24 inches long, 12 inches wide, and 16 inches tall. Find its volume in cubic inches, and then find how many gallons of water it holds (1 gallon = 231 in^3).**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

TEXTBOOK MODEL: PAPER / GRAPH / FORMULA

Section 8.4 — Practice A: Circles, Cones, and the Pythagorean Theorem

Key Vocabulary: circle • radius (r) • diameter (d = 2r) • circumference (C = 2πr) • area (A = πr²) • cone (V = 1/3πr²h) • hypotenuse

Name: _____ Date: _____ Score: ____ / 100

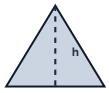
TEXTBOOK CONCEPT & VISUAL DIAGRAM

Circle: A = πr²



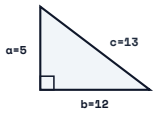
r = d ÷ 2 | 36π ≈ 113.10

Cone: V = 1/3πr²h



Cone = 1/3 of Cylinder!

Right Triangle: a²+b²=c²



c = √(5²+12²) = √169 = 13

HOW THE TEXTBOOK & VISUAL MODEL WORK TOGETHER:

Textbook Circle & Cone Formulas: Circle Area A = πr² (if given diameter d, divide by 2 first: r = d/2). Cone Volume V = 1/3Bh = 1/3πr²h.

Textbook Pythagorean Theorem: In a right triangle with legs a and b and hypotenuse c, $a^2 + b^2 = c^2$, so $c = \sqrt{(a^2 + b^2)}$.

WATCH OUT: If given diameter d, divide by 2 FIRST to get radius r = d ÷ 2 before squaring r²! And don't forget the 1/3 for cones!

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

Problem: Find the area of a circular pizza with radius r = 6 in. (round to 2 decimal places), and find the diagonal length of a ramp with legs 12 ft and 5 ft.

WAY 1: Formula Evaluation (Exact π & Square Root)

Circle (r = 6): A = π(6²) = 36π ≈ 113.10 in². Right triangle (legs 12, 5): $c^2 = 12^2 + 5^2 = 144 + 25 = 169 \rightarrow c = \sqrt{169} = 13$ ft.

WAY 2: Decimal Estimate (π ≈ 3.14) & Pythagorean Triples

Circle: 36 × 3.14 = 113.04 in² (or 36 × 3.1416 = 113.10 in²). Triangle: recognize the 5-12-13 Pythagorean triple → c = 13 ft.

Answer: Pizza = 113.10 in.²; Ramp diagonal = 13 ft

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.4 PRACTICE A (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

6 f ● 1 2 ENTER 5 g

Cut the 12-inch diameter in half (r = 6) and calculate πr² and √(12² + 5²) on paper first. Check on your SC-6: Press 6 [f][CIRC] to verify 113.10 in², and 12 [ENTER] 5 [g][HYP] to verify 13 ft!

SECTION 8.4 PRACTICE A — KEY IDEAS & MULTI-METHOD PRACTICE

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

1 **Find the area of a circle with radius r = 5 cm (round to the nearest hundredth).**

Starter Step 1: By PEMDAS, square the radius FIRST ($r^2 = 5 \times 5$), and then multiply by π.

Way 1 (Paper Work):

r = _____ | r² = _____

Area A = π × r² = _____

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

2 **Garden Sundial: A circular garden sundial has a diameter of 30 cm across the center. Find its area to the nearest hundredth.**

Starter Step 1: Divide the 30 cm diameter by 2 to find the radius r FIRST, then square the radius and multiply by π.

Way 1 (Paper Work):

r = _____ | r² = _____

Area A = π × r² = _____

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

3 **Find the hypotenuse c of a right triangle with legs a = 3 cm and b = 4 cm.**

Way 1 (Paper Work):

a² + b² = ___ + ___ = ___

c = √(a² + b²) = _____

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

4 **Treehouse Zip-Line Shortcut: A backyard treehouse platform is 6 meters high, and the anchor post is 8 meters away across flat ground. How long is the straight diagonal zip-line cable connecting them?**

Way 1 (Paper Work):

r = _____ | r² = _____

Area A = π × r² = _____

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

5 **A skateboard ramp has a horizontal base of 12 feet and a vertical back height of 5 feet. How long is the sloped riding surface?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **A circular landing pad has a diameter of d = 16 meters. What is its radius r, and what is its area rounded to the nearest hundredth?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **Conical Sand Filtration Pile: A conical pile of water-filtration sand at the treatment plant has a base radius of r = 3 meters and a height of h = 2 meters. What is the volume of the sand pile, rounded to the nearest hundredth?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Find the volume of a cone with radius r = 6 inches and height h = 5 inches, rounded to the nearest hundredth.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Cylinder vs. Cone Volume: A cylinder and a cone both have radius r = 3 cm and height h = 10 cm. Find the volume of the cylinder and the volume of the cone, rounded to the nearest hundredth.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Widescreen Monitor Diagonal: Computer monitors are advertised by their diagonal screen length. If a monitor screen is 32 inches wide and 24 inches tall, what is its diagonal measurement?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

TEXTBOOK MODEL: PAPER / GRAPH / FORMULA

Section 8.4 — Practice B: Modeling Real Life (Circles, Cones, and the Pythagorean Theorem)

Textbook Ways: Exact Form in Terms of π & $a^2 + b^2 = c^2$ | Decimal Approximation ($\pi \approx 3.14$) & Scaled Triples **Name:** _____ **Date:** _____ **Score:** ____ / 100

WORKED EXAMPLE — VOLUME OF A CONE (2 TEXTBOOK WAYS = +20 PTS DOUBLE)

Problem: A waffle cone has a radius of 3 centimeters and a height of 10 centimeters. Find the volume of the cone rounded to the nearest hundredth.

WAY 1: Cone Formula $V = 1/3\pi r^2 h$

Base area $B = \pi(3^2) = 9\pi$ cm^2. Multiply by 1/3 × height: $V = 1/3(9\pi)(10) = 3\pi \times 10 = 30\pi \approx 94.25$ cm^3.

WAY 2: Find Cylinder Volume First, Then Divide by 3

A cylinder with r = 3 and h = 10 has $V = \pi(3^2)(10) = 90\pi \approx 282.74$ cm^3. Divide by 3: $282.74 \div 3 \approx 94.25$ cm^3.

Check: 3 cones of 30π cm^3 equal 1 cylinder of 90π cm^3.

WATCH OUT: If given diameter d, divide by 2 FIRST to get radius $r = d \div 2$ before squaring r^2! And don't forget the 1/3 for cones!

Answer: 94.25 cm^3 (exact: 30π cm^3)

CHECK YOUR WORK ON THE SC-6 CALCULATOR — SECTION 8.4 PRACTICE B (SOLVE BY HAND FIRST, THEN VERIFY!)

Worked Example SC-6 Check Keystrokes:

3 [f] [●] 1 0 [g] [▲]

Calculate $V = 1/3\pi r^2 h$ on paper first. Then check on your SC-6 using the Cone Volume pipeline:
Type radius 3 [f][CIRC] height 10 [g][CONE] (Base Area × Height ÷ 3) to confirm 94.25 cm^3!

At the team pizza party, Marcus and his friends were sure that two 10-inch diameter pizzas had more pizza than one 16-inch diameter pizza—until they opened the boxes and saw how huge the 16-inch pizza really was. Working it out on a napkin, Marcus caught the two traps that fool almost everyone with circles: first, a 16-inch pizza has a diameter of 16 inches, so you MUST cut it in half to get the radius (r = 8 inches, not 16!); second, because the area formula squares the radius ($A = \pi r^2$), one 8-inch radius gives $64\pi \approx 201$ in^2, easily beating two 5-inch radius pizzas ($2 \times 25\pi \approx 157$ in^2).

SECTION 8.4 PRACTICE B — MODELING REAL LIFE & APPLICATIONS

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

1 **Trampoline Mat: A circular trampoline has a radius of 7 feet. What is the area of the jumping mat, rounded to the nearest hundredth?**

Starter Step 1: Square the 7-foot radius FIRST (7 × 7), and then multiply by π to find the circular mat's area.

Way 1 (Paper Work):

r = _____ | r^2 = _____

Area $A = \pi \times r^2 \approx$ _____

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

2 **Ferris Wheel Circle: A Ferris wheel has a diameter of 40 meters. What is its radius, and what is the area enclosed by the wheel (to the nearest hundredth)?**

Starter Step 1: Divide the 40-meter diameter by 2 to find the radius r, then square r and multiply by π.

Way 1 (Paper Work):

r = _____ | r^2 = _____

Area $A = \pi \times r^2 \approx$ _____

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

3 **Bicycle Tire Distance: A bicycle wheel has a radius of 14 inches from the center hub to the tire tread. How many inches forward does the bike roll in one full turn of the wheel (its circumference, to the nearest hundredth)?**

Way 1 (Paper Work):

r = _____ | r^2 = _____

Area $A = \pi \times r^2 \approx$ _____

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

4 **Zipline Cable: A zipline tower is 15 meters tall and is anchored to the ground 20 meters away horizontally. How long is the diagonal zipline cable?**

Way 1 (Paper Work):

r = _____ | r^2 = _____

Area $A = \pi \times r^2 \approx$ _____

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

5 **Monitor Diagonal: A rectangular computer monitor screen is 16 inches wide and 12 inches tall. What is its diagonal screen size?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

6 **Snow Cone Cup: A paper snow cone cup is shaped like a cone with radius 4 cm and height 9 cm. What is its volume (to the nearest hundredth)?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

7 **Highway Safety Cone: A traffic cone has a base diameter of 12 inches and a height of 15 inches. What is its volume (to the nearest hundredth)?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

8 **Pizza Size Comparison: Does one 16-inch diameter pizza or two 10-inch diameter pizzas give you more total pizza area? Justify your answer by finding the areas.**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

9 **Basketball Court Semicircle: The top of a basketball free-throw lane is a semicircle with a radius of 6 feet. What is the area of the semicircle (to the nearest hundredth)?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

10 **Ladder Against a Wall: The bottom of a ladder is placed 8 feet from the base of a wall so that the top of the ladder reaches 15 feet up the wall. How long is the ladder?**

Way 1 (Show Paper Steps):

Way 2 (2nd Method / Check):

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

SUMMATIVE QUIZ: 10 ITEMS × 10 PTS = 100

Unit 8 Mastery Quiz: Surface Area & Volume of 3D Solids

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

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

Standards Assessed: CCSS 6.G.A.2, 6.G.A.4 • TEKS 6.8D, 7.9A, 7.9D • FL MA.6.GR.2.3–4 • UIL Calculator Applications 3D Solids, Surface Area & Volume

1 CORE FLUENCY (SEC 8.1) • 10 PTS

How many faces, edges, and vertices does a rectangular prism have?

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

2 CORE FLUENCY (SEC 8.2) • 10 PTS

Find the total surface area of a rectangular prism with length 8 cm, width 5 cm, and height 4 cm.

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

3 CORE FLUENCY (SEC 8.2) • 10 PTS

Find the total surface area of a cube with edge length 6 in.

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

4 CORE FLUENCY (SEC 8.3) • 10 PTS

A square pyramid has a 10 m by 10 m base and four triangular lateral faces each with slant height 12 m. Find its total surface area.

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

5 CORE FLUENCY (SEC 8.4) • 10 PTS

Find the volume of a rectangular prism with length 9 ft, width 4.5 ft, and height 6 ft.

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

6 CORE FLUENCY (SEC 8.4) • 10 PTS

How many 1/2-inch cubes are needed to completely fill a rectangular box measuring 3 in. by 2 in. by 1 1/2 in.?

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

7 REAL LIFE (SEC 8.2) • 10 PTS

A gift box is 10 in. long, 6 in. wide, and 5 in. tall. How many square inches of wrapping paper are needed to cover all 6 faces with no overlap?

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

8 REAL LIFE (SEC 8.4) • 10 PTS

A rectangular aquarium holds 360,000 cm^3 of water. If its base is 100 cm long and 60 cm wide, what is the water depth h?

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

9 REAL LIFE (SEC 8.3) • 10 PTS

A triangular prism tent has two triangular ends (base 6 ft, height 4 ft) and three 6 ft by 8 ft rectangular sides (including the floor). Find the total surface area.

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

10 ERROR ANALYSIS (SEC 8.2) • 10 PTS

Liam found the surface area of a 5 cm by 4 cm by 3 cm prism by multiplying $5 \times 4 \times 3 = 60$ cm^2. Explain what he actually found and compute the true surface area.

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

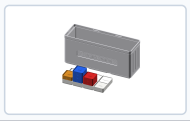
Unit 8: Surface Area & Volume of 3D Solids — Practice A & B Complete Key

Big Ideas Math Grade 6 — Chapter 8 • Concept → Blocks (When Applicable: Place Value Blocks & Fraction Strips) → Calculator

1. Concept (Stack Approach): Surface area sums 2D face areas across an unfolded net, whereas 3D volume multiplies the 2D base area B (in Y) by the perpendicular height h (in X).

2. Blocks (When Applicable — Place Value & Fraction): Pack Place Value unit blocks to see V = B·h in layers, and use Fraction Strips to model fractional edge lengths.

3. Calculator (SC-6): Accumulate opposite face pairs with [Σ+] → [f][Σx] for surface area, multiply Base Area × Height with [f][RECT] → [f][PRISM] for volume, and verify [f][CIRC] → [g][CONE] and [g][HYP].



SEC 8.1 (pp.77-78): THREE-DIMENSIONAL FIGURES, NETS & RECTANGULAR PRISMS

Methods: W1: Unfold into a 6-Face 2D Net | W2: Opposite Face Pairs SA = 2(lw + lh + wh) | W3: Lateral Strip Ph + 2B

PRACTICE A (p.77): KEY IDEAS (#1-#10) — ExA: 158 cm²		PRACTICE B (p.78): REAL LIFE (#1-#10) — ExB: Cube = 294 in²; Open-Top Bin = 260 cm²	
A1: 96 cm² (4² × 6) Check: 4 [x²] 6 [×]	**A2: 486 in.²** (9² × 6) Check: 9 [x²] 6 [×]	**B1: 2(160 + 600 + 240) = 2,000 cm²** Check: 20 [ENT] 8 [×] 20 [ENT] 30 [×] [+] 8 [ENT] 30 [×] [+] 2 [×]	**B2: 1 face = 81 in²; Total SA = 486 in²** (9² × 6) Check: 9 [x²] 6 [×]
A3: 108 cm² (2(24)+2(18)+2(12)) Check: Mental / Table Check	**A4: 160 in.²** (2(50)+2(20)+2(10)) Check: Mental / Table Check	**B3: 288 + 720 + 360 = 1,368 in²** Check: 24 [ENT] 12 [×] 24 [ENT] 15 [×] 2 [×] [+] 12 [ENT] 15 [×] 2 [×] [+]	**B4: SA = 500 in²; yes (100 in² to spare)** Check: 15 [ENT] 10 [×] 15 [ENT] 4 [×] [+] 10 [ENT] 4 [×] [+] 2 [×]
A5: 392 ft² (2(96)+2(60)+2(40)) Check: Mental / Table Check	**A6: 85 m²** (2(20)+2(12.5)+2(10)) Check: Mental / Table Check	**B5: 120 + 192 + 160 = 472 ft²** Check: 12 [ENT] 10 [×] 12 [ENT] 8 [×] 2 [×] [+] 10 [ENT] 8 [×] 2 [×] [+]	**B6: 1 face = 25 cm²; edge = 5 cm** (√((150 ÷ 6))) Check: 150 [ENT] 6 [÷] [f][√x]
A7: One face = 25 cm²; s = 5 cm (√((150 ÷ 6))) Check: 150 [ENT] 6 [÷] [f][√x]	**A8: 94 cm² (He only summed 3 faces instead of doubling for all 6 faces)** Check: 47 [ENT] 2 [×]	**B7: 32 + 8 = 40 ft²** (((4 × 2) × 4) + ((2 × 2) × 2)) Check: 4 [ENT] 2 [×] 4 [×] 2 [ENT] 2 [×] 2 [×] [+]	**B8: 2(24 + 60 + 40) = 248 cm²** Check: 6 [ENT] 4 [×] 6 [ENT] 10 [×] [+] 4 [ENT] 10 [×] [+] 2 [×]
A9: 2,100 cm² (600 + 2(450) + 2(300)) Check: Mental / Table Check	**A10: 500 in.² needed; Yes, with 50 in.² to spare** Check: Mental / Table Check	**B9: 54 cm² vs. 216 cm² (4 times as great)** ((6² × 6) ÷ 54) Check: 6 [x²] 6 [×] 54 [÷]	**B10: 160 cm²** (4² × 10) Check: 4 [x²] 10 [×]

SEC 8.2 (pp.79-80): SURFACE AREAS OF TRIANGULAR PRISMS AND PYRAMIDS

Methods: W1: Add All Individual Faces on the 2D Net | W2: Base Area + Combined Lateral Area

PRACTICE A (p.79): KEY IDEAS (#1-#10) — ExA: 340 m²		PRACTICE B (p.80): REAL LIFE (#1-#10) — ExB: 288 square feet	
A1: 96 cm² (6² + (1/2(6×5) × 4)) Check: 6 [x²] 6 [ENT] 5 [g][TRI] 4 [×] [+]	**A2: 224 in.²** (8² + (1/2(8×10) × 4)) Check: 8 [x²] 8 [ENT] 10 [g][TRI] 4 [×] [+]	**B1: 24 + 80 + 48 = 152 ft²** (((1/2(6×4) × 2) + ((5×8) × 2)) + (6×8)) Check: 6 [ENT] 4 [g][TRI] 2 [×] 5 [ENT] 8 [f][RECT] 2 [×] [+] 6 [ENT] 8 [f][RECT] [+]	**B2: 144 + 240 = 384 cm²** (12² + (1/2(12×10) × 4)) Check: 12 [x²] 12 [ENT] 10 [g][TRI] 4 [×] [+]
A3: 360 ft² (12² + (1/2(12×9) × 4)) Check: 12 [x²] 12 [ENT] 9 [g][TRI] 4 [×] [+]	**A4: 62.4 cm²** (1/2(6×5.2) × 4) Check: 6 [ENT] 5.2 [g][TRI] 4 [×]	**B3: 96 ft²** (1/2(8×6) × 4) Check: 8 [ENT] 6 [g][TRI] 4 [×]	**B4: 13.8 + 240 = 253.8 cm²** ((6.9 × 2) + ((4×20) × 3)) Check: 6.9 [ENT] 2 [×] 4 [ENT] 20 [f][RECT] 3 [×] [+]
A5: 132 cm² (1/2(4×3) × 2) Check: 4 [ENT] 3 [g][TRI] 2 [×] (12) + 12×10 (120)	**A6: 150 ft²** (1/2(8×3) × 2) Check: 8 [ENT] 3 [g][TRI] 2 [×] (24) + 18×7 (126)	**B5: 48 + 120 = 168 in²** ((1/2(8×6) × 2) + (((8 + 6) + 10) × 5)) Check: 8 [ENT] 6 [g][TRI] 2 [×] 8 [ENT] 6 [+] 10 [+] 5 [×] [+]	**B6: 15.6 cm²** (1/2(3×2.6) × 4) Check: 3 [ENT] 2.6 [g][TRI] 4 [×]
A7: 110.88 cm² (1/2(8×6.93) × 4) Check: 8 [ENT] 6.93 [g][TRI] 4 [×]	**A8: Triangular prism: 2 triangles + 3 rectangles; Square pyramid: 1 square + 4 triangles** Check: Mental / Table Check	**B7: 96 + 600 = 696 ft²** ((1/2(16×6) × 2) + ((10×30) × 2)) Check: 16 [ENT] 6 [g][TRI] 2 [×] 10 [ENT] 30 [f][RECT] 2 [×] [+]	**B8: 15 in² per face; slant height = 5 in** ((96 - 36) ÷ 4) Check: 96 [ENT] 36 [-] 4 [÷]
A9: 152 ft² (24 + 48 + 80) Check: Mental / Table Check	**A10: 108 ft²** (1/2(9×6) × 4) Check: 9 [ENT] 6 [g][TRI] 4 [×]	**B9: 96 + 480 = 576 cm²** ((1/2(12×8) × 2) + (((10 + 10) + 12) × 15)) Check: 12 [ENT] 8 [g][TRI] 2 [×] 10 [ENT] 10 [+] 12 [+] 15 [×] [+]	**B10: Pyramid A (260 cm² > 224 cm²)** (8² + (1/2(8×10) × 4)) Check: 10 [x²] 10 [ENT] 8 [g][TRI] 4 [×] [+] 8 [x²] 8 [ENT] 10 [g][TRI] 4 [×] [+]

SEC 8.3 (pp.81-82): VOLUMES OF RECTANGULAR PRISMS

Methods: W1: Base Area × Height (V = Bh) | W2: Multiply Length × Width × Height (Fractions or Decimals)

PRACTICE A (p.81): KEY IDEAS (#1-#10) — ExA: Crate = 480 in.³; Aquarium = 10 1/2 ft³		PRACTICE B (p.82): REAL LIFE (#1-#10) — ExB: 8 inches deep	
A1: 3,024 cm³ (Prism((18×6)×28)) Check: 18 [ENT] 6 [f][RECT] 28 [f][PRISM]	**A2: 125 in.³** (5³) Check: 5 [x³]	**B1: 500 m³** (Prism((25×10)×2)) Check: 25 [ENT] 10 [f][RECT] 2 [f][PRISM]	**B2: 48 ft³** (Prism((8×4)×1.5)) Check: 8 [ENT] 4 [f][RECT] 1.5 [f][PRISM]
A3: 500 m³ (Prism((25×10)×2)) Check: 25 [ENT] 10 [f][RECT] 2 [f][PRISM]	**A4: 224 m³** (Prism(32×7)) Check: 32 [ENT] 7 [f][PRISM]	**B3: 15,625 cm³** (25³) Check: 25 [x³]	**B4: 65 in³** (Prism((6.5×4)×2.5)) Check: 6.5 [ENT] 4 [f][RECT] 2.5 [f][PRISM]
A5: 10 1/2 ft³ (10.5) (Prism((3.5×1.5)×2)) Check: 3.5 [ENT] 1.5 [f][RECT] 2 [f][PRISM]	**A6: 27 in.³** (Prism((4.5×3)×2)) Check: 4.5 [ENT] 3 [f][RECT] 2 [f][PRISM]	**B5: 8 per in³; 96 half-inch cubes** (12 × 8) Check: 12 [ENT] 8 [×]	**B6: 3 cm rise** (120 ÷ 40) Check: 120 [ENT] 40 [÷]
A7: 6 in. (270 ÷ (9 × 5)) Check: 270 [ENT] 9 [ENT] 5 [×] [÷]	**A8: 8 half-inch cubes** (2³) Check: 2 [x³]	**B7: 77 ft³** (Prism((5.5×4)×3.5)) Check: 5.5 [ENT] 4 [f][RECT] 3.5 [f][PRISM]	**B8: 36 ft³** ((12 × 9) ÷ 3) Check: 12 [ENT] 9 [×] 3 [÷]
A9: 8 inches (360 ÷ 45) Check: 360 [ENT] 45 [÷]	**A10: 216 half-inch cubes** (27 × 2³) Check: 27 [ENT] 2 [x³] [×]	**B9: 8 inches** (360 ÷ 45) Check: 360 [ENT] 45 [÷]	**B10: 4,608 in³ ≈ 19.95 (about 20) gallons** Check: 24 [ENT] 12 [f][RECT] 16 [f][PRISM] 231 [÷]

SEC 8.4 (pp.83-84): CIRCLES, CONES, AND THE PYTHAGOREAN THEOREM

Methods: W1: Exact Form in Terms of π & $a^2 + b^2 = c^2$ | W2: Decimal Approximation (π ≈ 3.14) & Scaled Triples

PRACTICE A (p.83): KEY IDEAS (#1-#10) — ExA: Pizza = 113.10 in.²; Ramp diagonal = 13 ft		PRACTICE B (p.84): REAL LIFE (#1-#10) — ExB: 94.25 cm³ (exact: 30π cm³)	
A1: 78.54 cm² (π × 5²) Check: 5 [f][CIRC]	**A2: 706.86 cm²** (π × 15²) Check: 15 [f][CIRC]	**B1: 153.94 ft²** (π × 7²) Check: 7 [f][CIRC]	**B2: r = 20 m; Area ≈ 1,256.64 m²** (π × 20²) Check: 20 [f][CIRC]
A3: 5 cm (√(3² + 4²)) Check: 3 [ENT] 4 [g][HYP]	**A4: 10 meters** (√(6² + 8²)) Check: 6 [ENT] 8 [g][HYP]	**B3: 87.96 inches** ((2 × π) × 14) Check: 2 [ENT] [π] [×] 14 [×]	**B4: 25 meters** (√(15² + 20²)) Check: 15 [ENT] 20 [g][HYP]
A5: 13 ft (√(12² + 5²)) Check: 12 [ENT] 5 [g][HYP]	**A6: r = 8 m; Area = 201.06 m²** (π × (16 ÷ 2)²) Check: 16 [ENT] 2 [÷] [f][CIRC]	**B5: 20 inches** (√(16² + 12²)) Check: 16 [ENT] 12 [g][HYP]	**B6: 150.80 cm³ (48π)** (1/3(π × 4²)(9)) Check: 4 [f][CIRC] 9 [g][CONE]
A7: 18.85 m³ (1/3(π × 3²)(2)) Check: 3 [f][CIRC] 2 [g][CONE]	**A8: 188.50 in.³** (1/3(π × 6²)(5)) Check: 6 [f][CIRC] 5 [g][CONE]	**B7: 565.49 in³ (180π)** (1/3(π × 6²)(15)) Check: 6 [f][CIRC] 15 [g][CONE]	**B8: One 16-in pizza (201.06 in² > 157.08 in²)** (π × 5² × 2) Check: 8 [f][CIRC] 5 [f][CIRC] 2 [×]
A9: Cylinder = 282.74 cm³; Cone = 94.25 cm³ (1/3(π × 3²)(10)) Check: 3 [f][CIRC] 10 [g][CONE]	**A10: 40 inches** (√(32² + 24²)) Check: 32 [ENT] 24 [g][HYP]	**B9: 56.55 ft²** (π × 6² ÷ 2) Check: 6 [f][CIRC] 2 [÷]	**B10: 17 feet** (√(8² + 15²)) Check: 8 [ENT] 15 [g][HYP]

UNIT 08 MASTERY QUIZ KEY (p.119 • TEKS 6.8D, 7.9A, 7.9D): Q1: 6 faces, 12 edges, 8 vertices Q2: 184 cm² Q3: 216 in² Q4: 340 m² Q5: 243 ft³

Quiz Q6–Q10 Answers: Q6: 72 cubes (Vol = 9 in³) Q7: 280 in² Q8: 60 cm Q9: 168 ft² Q10: 60 is Vol; SA = 94 cm²