

Chapter 4 Area of Parallelograms Triangles and Trapezoids

Teacher Guide and Diagnostic Answer Key

Teacher Guide

Teacher Chapter-at-a-Glance

None required

Spend the most time on identifying the perpendicular height versus a slanted side. It is the chapter's central error and appears across every shape.

Ask: does this side meet the base at exactly 90° , or is it slanted?

Mastery Decision Guide

What a missed Tripwire item actually means, and what to do about it before moving on.

Confirmation and Fresh Recheck

Confirm with: Ask the student to point to the right-angle marker and identify the segment perpendicular to the chosen base.

Fresh recheck: Rotate a triangle so the perpendicular height falls outside the visible interior; require the correct base-height pair.

Decision rule: Move forward only when the fresh response is secure and the reasoning survives the changed representation or context.

Missed Tripwire #1 → Using one base for a trapezoid (Mistake 3). Uses only b_1 or b_2 . Review before the next chapter.

Ready to Learn Check

Quick check before starting. A wrong answer below points to a specific gap worth closing first, not just a miss to shrug off.

1. What does it mean for two lines to be perpendicular?

Correct answer: Perpendicular means meeting at 90° .

Likely wrong answer: It means the lines are the same length.

Misconception: Not yet connecting the word perpendicular to a specific 90° angle.

Next move: Review right angles with a corner of paper or a set square before starting the chapter.

2. A rectangle is 9 cm by 4 cm. Find its area.

Correct answer: 36 cm^2

Likely wrong answer: 26 cm^2 (adding instead of multiplying)

Misconception: Reaching for the perimeter procedure instead of the area procedure.

Next move: Review rectangle area (length times width) before starting the chapter.

3. A rectangle has area 24 cm^2 and one side is 4 cm. Find the other side.

Correct answer: 6 cm

Likely wrong answer: 20 cm (subtracting instead of dividing)

Misconception: Not yet seeing that a missing dimension is found by dividing the area by the known side.

Next move: Review dividing to undo a multiplication before starting the chapter.

Practice

Assign the full set or select items for targeted review. Teacher solutions follow each question.

1. Parallelogram: $b = 7\text{ cm}$, $h = 4\text{ cm}$. Find area.

Solution: 1. 28 cm^2

2. Parallelogram: $b = 15\text{ m}$, $h = 6\text{ m}$. Find area.

Solution: 2. 90 m^2

3. Triangle: $b = 10\text{ cm}$, $h = 8\text{ cm}$. Find area.

Solution: 3. 40 cm^2

4. Triangle: $b = 13\text{ m}$, $h = 4\text{ m}$. Find area.

Solution: 4. 26 m^2

5. Trapezoid: bases 6 cm and 12 cm , $h = 5\text{ cm}$. Find area.

Solution: 5. 45 cm^2

6. Trapezoid: bases 11 m and 17 m , $h = 4\text{ m}$. Find area.

Solution: 6. 56 m^2

7. Triangle: $b = 20\text{ cm}$, $h = 9\text{ cm}$, slanted side = 14 cm . Which is the height?

Solution: 7. 9 cm

8. Parallelogram: $b = 9.5\text{ cm}$, $h = 4\text{ cm}$. Find area.

Solution: 8. 38 cm^2

9. Triangle garden: $b = 18\text{ m}$, $h = 12\text{ m}$. Find area.

Solution: 9. 108 m^2

10. Explain why a slanted side is not always the height.

Solution: 10. The height must meet the base at 90° .

Chapter Answer Key

Tripwire Check

1. No. The trapezoid needs both bases: $((5 + 11) \times 4) \div 2 = 32\text{ cm}^2$.

Exit Ticket

1. 98 cm^2

2. 60 m^2

3. 52 cm^2

Worksheet 1: Guided Practice

1. 36 cm^2

2. 36 cm^2

3. 55 cm ²	4. 7 cm
5. parallelogram	6. triangle
7. trapezoid	8. 18 cm ²
9. 20 cm ²	10. 21 cm ²
11. 72 m ²	12. 77 m ²
13. cm ²	14. m ²
15. The height is the perpendicular distance to the base, meeting it at 90°.	

Worksheet 2: Independent Practice

1. 56 cm ²	2. 42 cm ²
3. 40 cm ²	4. 65 m ²
5. 81 m ²	6. 65 m ²
7. 72 cm ²	8. 44 cm ²
9. 96 cm ²	10. 66 m ²
11. 50 m ²	12. 96 m ²
13. 36 m ²	14. 120 cm ²
15. 140 cm ²	

Worksheet 3: Mixed Practice & Application

Item 14 (Non-Routine)

Correct answer: Rectangle: $A = 12 \times 7 = 84 \text{ cm}^2$. Triangle: $A = (12 \times 7) \div 2 = 42 \text{ cm}^2$. The triangle is half because it is exactly half of a matching rectangle with the same base and height.

Likely wrong answer: Both areas are the same because the base and height are the same.

Misconception: Not yet seeing that a triangle is literally half of the rectangle formed by the same base and height.

Next move: Draw the rectangle, then draw the diagonal that splits it into two matching triangles, to show the half relationship visually.

Item 15 (Non-Routine)

Correct answer: The student added all three numbers and divided by 2, but never multiplied. The correct steps are: add the bases ($10 + 18 = 28$), multiply by the height ($28 \times 5 = 140$), then divide by 2: $140 \div 2 = 70 \text{ cm}^2$.

Likely wrong answer: $(10 + 18 + 5) \div 2 = 16.5 \text{ cm}^2$.

Misconception: Treating the trapezoid formula as a simple average of all three given numbers instead of following the add-multiply-divide sequence.

Next move: Have the student write out each step of the formula separately, labeling what each operation represents, before combining them.

1. 126 m^2	2. 27 m^2
3. 128 m^2	4. 63 cm^2
5. 7 cm	6. 6 m
7. 78 cm^2	8. Rearrangement preserves area.
9. It identifies the perpendicular height.	10. 36 m^2
11. 55 cm^2	12. 200 m^2
13. 16 cm	14. (see diagnostic above)
15. (see diagnostic above)	

Variation Lab — Expected Ideas

1. With base 10, heights 3 and 6 give areas 30 and 60: doubling perpendicular height doubles area.
2. For triangle area, use base 14 and perpendicular height 5; the slanted 9 is irrelevant. Area = 35 cm^2 .
3. Same base and perpendicular height: parallelogram area is twice triangle area.

Transfer Check — Suggested Responses

Familiar: 52 cm^2 . Altered: 60 m^2 . Non-routine: $72 = ((8+16)h)/2$ gives $h=6 \text{ cm}$. Repair: use the perpendicular height: $(18 \times 6)/2 = 54 \text{ cm}^2$.