



Area by composing & decomposing

GRADE 6 MATH

Answer keys for the exit ticket, practice worksheet, and homework, plus notes for the lesson slides. Each answer shows the steps and the most likely wrong answer (“If wrong”), so you can tell what a mistake means, not just that it is one. Questions go from **fluency** to **application** to **reasoning**.

Exit Ticket — answer key

Use: End of the area lesson. 5–8 min, independent. Opens the G6 Geometry domain.

Timing: 5–8 min · independent. Item 1 catches the missing $\div 2$; item 2 catches students who then halve everything.

1. Triangle $b = 8$, $h = 5$? **FLUENCY**

Answer: **20 square units**

1. A triangle is half a rectangle with the same base and height.
2. $(8 \times 5) \div 2 = 40 \div 2 = 20$ square units.

If wrong: Answered 40 — forgot to halve. Every triangle area ends with a division by 2.

2. Parallelogram $b = 12$, $h = 7$? **APPLICATION**

Answer: **84 square units**

1. A parallelogram can be cut and rearranged into a rectangle with the same base and height.
2. $12 \times 7 = 84$ square units. No halving — that is only for triangles.

If wrong: Halved it to 42 by over-applying the triangle rule.

3. Trapezoid sides 6 and 10, height 4? **APPLICATION**

Answer: **32 square units**

1. Average the parallel sides: $(6 + 10) \div 2 = 8$.
2. Multiply by the height: $8 \times 4 = 32$ square units.
3. (Equivalently, decompose into a 6×4 rectangle plus a triangle of base 4, height 4: $24 + 8 = 32$.)

If wrong: Multiplied $6 \times 10 \times 4$, or added the parallel sides without averaging.

4. L-shape: 8×10 minus 3×4 ? REASONING

Answer: **68 square units — subtract the missing corner from the whole rectangle**

1. Whole rectangle: $8 \times 10 = 80$ square units.
2. Removed corner: $3 \times 4 = 12$ square units.
3. $80 - 12 = 68$ square units.
4. Strategy: COMPOSE the shape into one big rectangle, then subtract what is missing.
You could also decompose it into two rectangles and add — both give 68.

If wrong: Added $80 + 12$, or found only one of the two pieces. Decide first whether you are adding parts or subtracting a hole.

Quick answers for fast checking:

#	Level	Answer
1	fluency	20 sq units
2	application	84 sq units
3	application	32 sq units
4	reasoning	68 sq units

Practice Worksheet — answer key

Use: During the lesson after the mini-lesson/deck. Item 9 is the slant-height trap; item 7 rewards a sanity check against the whole rectangle.

Timing: 15–25 min · pairs or independent · circulate on 7–9. Items 1–3 fluency, 4–6 application, 7–9 reasoning. Insist on square units in every answer.

1. Triangle 10 by 6? FLUENCY

Answer: **30 sq units**

1. $(10 \times 6) \div 2 = 30$.

If wrong: Answered 60 — forgot to halve.

2. Triangle 7 by 4? FLUENCY

Answer: **14 sq units**

1. $(7 \times 4) \div 2 = 14$.

If wrong: Answered 28.

3. Rectangle 9 by 5? FLUENCY

Answer: **45 sq units**

1. $9 \times 5 = 45$.

If wrong: Halved it to 22.5.

4. Parallelogram 15 by 8? APPLICATION

Answer: **120 sq units**

1. Rearranges into a rectangle: $15 \times 8 = 120$.

If wrong: Halved it to 60 — the triangle rule does not apply here.

5. Trapezoid 5 and 9, height 6? APPLICATION

Answer: **42 sq units**

1. Average the parallel sides: $(5 + 9) \div 2 = 7$.

2. $7 \times 6 = 42$ square units.

If wrong: Added $5 + 9 + 6$, or multiplied all three.

6. Triangle 9 by 12? APPLICATION

Answer: **54 sq units**

1. $(9 \times 12) \div 2 = 108 \div 2 = 54$.

If wrong: Answered 108.

7. L-shape 12×9 minus 5×4 ? REASONING

Answer: **88 sq units — subtracted**

1. Whole rectangle: $12 \times 9 = 108$.

2. Cut-out: $5 \times 4 = 20$.

3. $108 - 20 = 88$ square units. This is a compose-then-subtract shape.

If wrong: Added the two areas to get 128, which is larger than the whole rectangle — a quick sanity check catches that.

8. Rectangle 6×4 with a triangle (b 6, h 3) on top? REASONING

Answer: **33 sq units**

1. Rectangle: $6 \times 4 = 24$ square units.
2. Triangle: $(6 \times 3) \div 2 = 9$ square units.
3. Total: $24 + 9 = 33$ square units. This is a decompose-then-add shape.

If wrong: Forgot to halve the triangle (giving 42), or used the rectangle's height for the triangle.

9. Base 10, height 4, slant 5 — which gives the area? REASONING

Answer: **The perpendicular height 4; area = 20 square units**

1. Area uses the PERPENDICULAR height, the straight-up distance from the base.
2. $(10 \times 4) \div 2 = 20$ square units.
3. The slanted side of 5 is longer because it leans — using it would give 25, an overestimate.
4. The slant is a side length, useful for perimeter, not for area.

If wrong: Used the 5 because it was listed as a side. The height must form a right angle with the base.

Quick answers for fast checking:

#	Level	Answer
1	fluency	30 sq units
2	fluency	14 sq units
3	fluency	45 sq units
4	application	120 sq units
5	application	42 sq units
6	application	54 sq units
7	reasoning	88 sq units
8	reasoning	33 sq units
9	reasoning	20 sq units

Homework — answer key

Use: Parallels the practice sheet. Item 7's sanity check (the answer must be smaller than the whole rectangle) is worth naming aloud.

Timing: ~15 min at home · independent · review item 7 as the next-day warm-up.

1. Triangle 12 by 5? FLUENCY

Answer: **30 sq units**

1. $(12 \times 5) \div 2 = 30$.

If wrong: Answered 60.

2. Triangle 6 by 9? FLUENCY

Answer: **27 sq units**

1. $(6 \times 9) \div 2 = 27$.

If wrong: Answered 54.

3. Rectangle 11 by 7? FLUENCY

Answer: **77 sq units**

1. $11 \times 7 = 77$.

If wrong: Halved it to 38.5.

4. Parallelogram 14 by 6? APPLICATION

Answer: **84 sq units**

1. $14 \times 6 = 84$; no halving.

If wrong: Halved it to 42.

5. Trapezoid 4 and 8, height 5? APPLICATION

Answer: **30 sq units**

1. $(4 + 8) \div 2 = 6$; $6 \times 5 = 30$ square units.

If wrong: Multiplied all three numbers.

6. Triangle 15 by 8? APPLICATION

Answer: **60 sq units**

1. $(15 \times 8) \div 2 = 60$.

If wrong: Answered 120.

7. L-shape 10×8 minus 4×3 ? REASONING

Answer: **68 sq units — compose the whole rectangle, then subtract**

1. Whole: $10 \times 8 = 80$ square units.
2. Removed: $4 \times 3 = 12$ square units.
3. $80 - 12 = 68$ square units.

If wrong: Added to get 92, which exceeds the whole rectangle — impossible for a shape with a piece missing.

8. Rectangle 8×5 with triangle (b 8, h 4) on top? REASONING

Answer: **56 sq units**

1. Rectangle: $8 \times 5 = 40$ square units.
2. Triangle: $(8 \times 4) \div 2 = 16$ square units.
3. Total: $40 + 16 = 56$ square units.

If wrong: Forgot to halve the triangle (giving 72), or used 5 as the triangle's height.

Quick answers for fast checking:

#	Level	Answer
1	fluency	30 sq units
2	fluency	27 sq units
3	fluency	77 sq units
4	application	84 sq units
5	application	30 sq units
6	application	60 sq units
7	reasoning	68 sq units
8	reasoning	56 sq units

Lesson slides — teaching notes & timing

Mini-lesson deck: ~12–15 min, then launch into the practice sheet. Opens the G6 Geometry domain. Slide numbers match the deck.

Slide	~Time	Note
1/8	0:00	Frame the skill: every area problem reduces to shapes you already know.
2/8	1:00	Hook — poll 40 vs 20. Do NOT resolve. The missing $\div 2$ is the single most common area error.
3/8	3:00	Derive the halving rather than stating it — draw the enclosing rectangle so students SEE the half.

4/8	5:00	WE1 — resolve the hook. Then flag the reverse error: parallelograms and rectangles are NOT halved.
5/8	7:00	WE2 — perpendicular height. If you have a triangle cut-out, tip it so the slant and height are visibly different lengths.
6/8	9:00	CFU — all-student response. Answer 32 square units. Watch for $6 \times 10 \times 4$.
7/8	11:00	The two strategies, plus the sanity check: a shape with a hole must have less area than the full rectangle.
8/8	13:00	Launch the in-class practice sheet.