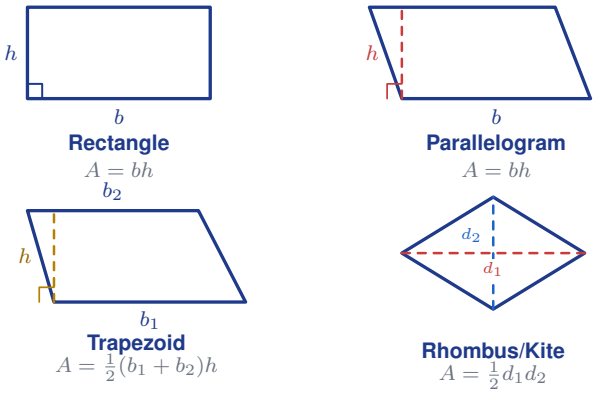
CCSS • 7.G.6

Area of Quadrilaterals

Name: _____	Date: _____	Score: _____ / 17

Different quadrilaterals have different formulas, but they all share the same core idea: use the right measurements for the shape! Rectangles and parallelograms use base times height; trapezoids use the average of the two bases times the height; rhombuses and kites use their diagonals. The real skill is looking at the figure in front of you and picking the formula that fits. Once you can do that, quadrilateral area problems become a breeze!



Key Concepts & Quick Review

Rectangle / Parallelogram: $A = b \times h$ (h must be perpendicular to b).
Trapezoid: $A = \frac{1}{2}(b_1 + b_2) \times h$ (b_1, b_2 are the two parallel sides).
Rhombus / Kite: $A = \frac{1}{2} \times d_1 \times d_2$ (d_1, d_2 are the diagonals).

Examples

① A trapezoid has parallel sides $8\ cm$ and $14\ cm$, with height $6\ cm$. Find its area.

Think It Through: For a trapezoid, first add the lengths of the two parallel sides, because the formula uses their average. Here $8 + 14 = 22$. Then apply $A = \frac{1}{2}(b_1 + b_2)h = \frac{1}{2}(22)(6)$. Half of 22 is 11, and $11 \times 6 = 66$, so the area is 66 square centimeters.

Answer: $66\ cm^2$

② A rhombus has diagonals $10\ cm$ and $14\ cm$. A parallelogram has base $9\ cm$ and height $8\ cm$. Which has the greater area?

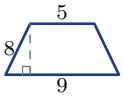
Think It Through: Use the correct formula for each shape. For the rhombus, $A = \frac{1}{2}d_1d_2 = \frac{1}{2}(10)(14) = 70\ cm^2$. For the parallelogram, $A = bh = (9)(8) = 72\ cm^2$. Now compare the two results directly: 72 is larger than 70, so the parallelogram has the greater area by $2\ cm^2$.

Answer: *Parallelogram ($72\ cm^2$) > rhombus ($70\ cm^2$)*

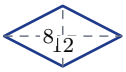
Practice Problems

Apply the correct formula for each quadrilateral.

1. Find the area of a rectangle with base 9 and height 7. _____
2. Find the area of a rectangle with base 13 and height 5. _____
3. Find the area of a parallelogram with base 11 and height 6. _____
4. Find the area of a parallelogram with base 8 and height 4.5. _____
5. Find the area of a trapezoid with bases 6 and 10 and height 4. _____
6. Find the area of a trapezoid with bases 5 and 9 and height 8. _____

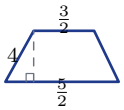


7. Find the area of a trapezoid with bases 7 and 13 and height 5. _____
8. Find the area of a rhombus with diagonals 12 and 8. _____



9. Find the area of a rhombus with diagonals 9 and 16. _____
10. Find the area of a kite with diagonals 10 and 14. _____
11. Find the area of a parallelogram with base 6.5 and height 8. _____
12. Find the area of a trapezoid with bases 3 and 11 and height 6. _____
13. Find the area of a rectangle with base 2.5 and height 12. _____
14. Find the area of a rhombus with diagonals 7 and 7. _____

15. Find the area of a trapezoid with bases $\frac{3}{2}$ and $\frac{5}{2}$ and height 4. _____



Study Tips

- For a **parallelogram**, the slanted side length is NOT the height. The height is the perpendicular distance between the bases.
- The trapezoid formula averages the two bases because the shape is "in between" two rectangles with those widths.
- A **square** is a special rectangle ($b = h = s$), so $A = s^2$. A square is also a rhombus with equal diagonals, giving $A = \frac{1}{2}d^2$.

Word Problems

16. A community garden is shaped like a trapezoid. The two parallel sides measure $24\,m$ and $36\,m$, and the perpendicular distance between them is $15\,m$. Topsoil costs $\$4.20$ per square metre. Find the garden's area and the total cost of topsoil. _____

17. A diamond-shaped tile (rhombus) has diagonals of $18\ cm$ and $24\ cm$. A room floor requires 150 of these tiles. Find the area of one tile, the total tiled area, and the cost if tiles are sold in boxes of 12 at $\$28$ per box.

_____

Answer Keys

1) 63
2) 65
3) 66
4) 36
5) 32
6) 56
7) 50
8) 48
9) 72
10) 70
11) 52
12) 42
13) 30
14) 24.5
15) 8
16) $450\ m^2$; cost \$1,890
17) One tile $216\ cm^2$; total $32{,}400\ cm^2$; 13 boxes; cost \$364

Step-by-Step Explanations

Strategy: For Complementary and Supplementary Angles, decide first whether the pair totals $90°$ or $180°$, then build the equation from that sum. An angle-pair setup gives students a clear total before the variable work begins.

Practice 1: Find the complement of a $30°$ angle. **Answer:** $60°$

For the first worked item, use 90 degrees for complements and 180 degrees for supplements.

Practice 15: Two equal angles are complementary. Find the measure of each angle. **Answer:** $45°$ each

Near the end of this topic, use 90 degrees for complements and 180 degrees for supplements.

Word-problem notes:

16. Answer: $5k - 10 + 2k + 15 = 180 \Rightarrow k = 25$; angles $= 115°$ and $65°$; obtuse and acute.

Because the fold creates supplementary angles, their measures add to $180°$. Write $(5k - 10) + (2k + 15) = 180$. This simplifies to $7k + 5 = 180$, so $7k = 175$ and $k = 25$. Substituting back gives $5(25) - 10 = 115°$ and $2(25) + 15 = 65°$. The larger one is obtuse because it is greater than $90°$, and the smaller one is acute.

17. Answer: $3m + 6 + m + 8 = 90 \Rightarrow m = 19$; wall angle $= 63°$, shelf angle $= 27°$; bracket tilts more toward wall.

The wall and shelf form a right angle, so the two bracket angles must add to $90°$. Write $(3m + 6) + (m + 8) = 90$. Simplifying gives $4m + 14 = 90$, so $4m = 76$ and $m = 19$. Now find the angles: with the wall, the angle is $3(19) + 6 = 63°$, and with the shelf, it is $19 + 8 = 27°$. Since the wall angle is larger, the bracket leans more toward the wall than toward the shelf.

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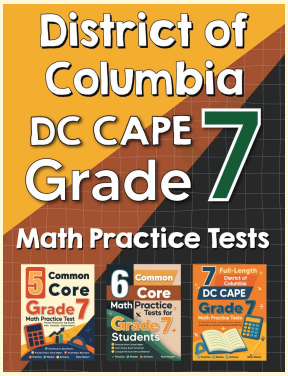

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